

REPORT

ON THE

COTTON PRODUCTION OF THE STATE OF SOUTH CAROLINA,

WITH A DISCUSSION OF

THE GENERAL AGRICULTURAL FEATURES OF THE STATE.

BY

HARRY HAMMOND,

SPECIAL AGENT.

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LETTERS OF TRANSMITTAL.

BERKELEY, CALIFORNIA, *September 26, 1882.*

To the SUPERINTENDENT OF CENSUS.

DEAR SIR: I transmit herewith a report on the cotton production and agricultural features of the state of South Carolina, by Harry Hammond, esq., of Beech Island, South Carolina, special agent of the census.

Mr. Hammond's report differs somewhat in plan and tenor from those that have been made of other states, in the especial attention bestowed by him upon the historic, statistical, economic, and commercial sides of the subject of cotton production, as well as of general agriculture, which are treated with great fullness and ability, thus forming a valuable contribution to the industrial history not only of South Carolina, but of the Atlantic cotton states generally.

While the general descriptions of the agricultural regions are as full and graphic as could be desired, I have to regret the omission of the descriptions of individual counties, with abstracts of answered schedules, that form Part II of the reports on the other cotton states, and are especially designed to furnish, in compact and convenient form, the information usually desired by immigrants. Mr. Hammond desired to substitute therefor the descriptions of individual townships, as abstracted from answered schedules and from reports made to the commissioner of agriculture of the state. But as these townships are units unknown to all but the most special state maps, such substitution does not appear to me to convey information of a character sufficiently definite to justify their publication in this work, the more as not nearly all the townships of each county were thus represented.

Very respectfully,

E. W. HILGARD,
Special Agent in charge of Cotton Production.

BEECH ISLAND, SOUTH CAROLINA, *May 25, 1882.*

Professor EUGENE W. HILGARD,

Special Agent in charge of Cotton Production, Berkeley, California.

DEAR SIR: I inclose herewith the report of cotton culture in South Carolina. The report embraces a sketch of the geography of the state, and its division into seven agricultural regions. These regions are distinguished by the diversity of their physical and geological features, their forest growth, climate, soils, difference of elevation above the sea-level, and to a large extent by the pursuits of the inhabitants.

In addition to the information furnished by the Census Office, or derived from personal travel under its auspices, this compilation includes—

1. Answers to schedules of questions touching soils and details of cotton culture, issued by you through the Census Office.
2. Answers to circulars sent by A. P. Butler, commissioner of agriculture of South Carolina, to each township in the state, touching its soils and resources.

3. Besides numerous pamphlets and reports on the earlier explorations of Carolina, valuable information has been obtained from the following publications: *Proceedings of the State Agricultural Society*, 4 volumes; *Mills' Statistics of South Carolina*, 1826; *Report of the Agricultural Survey of South Carolina*, by Edmund Ruffin, 1843; *Report of the Agricultural and Geological Survey of South Carolina*, by M. Tuomey, 1844; *Geology of South Carolina*, by M. Tuomey, 1849; and *Reports on the Geognostic Survey of South Carolina*, by O. M. Lieber, 4 volumes, 1856-'59.

Although no material change has been made in the boundary lines of the state since the surveys of 1764 and 1772, its area has been variously estimated on different occasions; in 1802 Governor Drayton estimates it at 24,080 square miles; in 1826 Mills makes it 30,213 square miles; in 1870 the estimate of the Ninth Census, based on the topographical sheets of the Coast Survey of 1865, places it at 34,000 square miles; the estimate of the Tenth Census, published some time after this report was commenced, places it at 30,570 square miles.

Cotton culture in South Carolina so much predominates over other pursuits, and monopolizes to so large an extent the resources of the state, that a full account of it would amount almost to a full account of the entire industrial and economic relations of the state. The valuation of the total real and personal property in the census year was something over \$120,000,000, as shown on the books of the comptroller-general; the cotton crop of that year sold for at least \$25,000,000, and this was about 60 per cent. of the value of all the agricultural productions of that year throughout the state. The attempt, and especially a first attempt, to portray concisely such an industry can only claim to be an approximation to correctness; it is to be hoped that the omissions, deficiencies, and inaccuracies in the accompanying report will not mislead in the preparation of more accurate accounts which the subject merits, and which will be given of it doubtless in the not remote future.

The pivotal questions affecting the prosperity and profitableness of agricultural pursuits in South Carolina are, as elsewhere, the fundamental ones relating to labor and land. Loosened, as agriculture in this state is, from all ancient moorings on these points, nowhere are more earnest and varied experiments being made as to the methods of organizing and co-regulating these factors of wealth. The remarkable advances made in material prosperity, as shown by this report, in the decade from 1870 to 1880, encourage the hope that a nearer approach to a correct system in these regards is being made.

Very respectfully,

HARRY HAMMOND.

TABULATED RESULTS OF THE ENUMERATION.

TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION.
TABLE II.—ACREAGE AND PRODUCTION OF LEADING CROPS.

TABULATED RESULTS OF THE ENUMERATION.

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TABLE I.—AREA, POPULATION, TILLED LAND, AND COTTON PRODUCTION.

Counties.	Area.	POPULATION.						TILLED LAND.			COTTON PRODUCTION.						
		Total.	Male.	Female.	White.	Color'd.	Average per square mile.	Acres.	Per cent. of area.	Per cent. of tilled land.	Acres.	Bales.	Product per acre.			Cotton acreage per square mile.	Bales per square mile.
													Bale.	Seed-cotton.	Lint.		
	Sq. mls.												Lbs.	Lbs.			
The State.....	30,170	995,577	400,408	505,169	391,105	604,472	33	3,736,090	0.19	0.37	1,364,249	522,548	0.38	543	181	45.0	17.0
Abbeville.....	960	40,815	20,060	20,755	13,172	27,043	43	209,465	0.34	0.40	83,538	26,380	0.32	456	152	87.0	27.0
Aiken.....	720	28,112	13,854	14,258	12,936	15,176	30	97,618	0.21	0.38	37,018	14,334	0.30	555	185	51.0	20.0
Anderson.....	760	33,612	16,573	17,039	12,747	14,865	44	159,153	0.33	0.38	61,060	21,897	0.36	513	171	80.0	29.0
Barnwell.....	1,300	39,857	19,942	19,915	13,853	26,004	31	236,706	0.28	0.35	83,463	28,764	0.34	486	162	64.0	22.0
Beaufort.....	1,100	30,176	14,602	15,574	2,442	27,734	27	49,022	0.07	0.24	11,570	2,740	0.24	342	114	11.0	2.5
Charleston.....	2,000	102,800	49,117	53,683	30,922	71,878	51	102,727	0.08	0.24	24,802	9,303	0.38	543	181	12.0	5.0
Chester.....	580	24,153	11,853	12,300	7,635	16,518	42	120,060	0.32	0.44	52,324	19,051	0.36	513	171	90.0	33.0
Chesterfield.....	800	16,345	8,006	8,339	9,498	6,847	20	60,852	0.12	0.30	18,480	7,733	0.42	600	200	23.0	10.0
Clarendon.....	720	19,190	9,600	9,590	6,282	12,908	27	82,293	0.18	0.32	26,687	8,589	0.32	456	152	37.0	12.0
Colleton.....	1,000	36,386	18,262	18,124	12,184	24,202	19	94,436	0.08	0.12	11,447	4,869	0.43	612	204	6.0	2.6
Darlington.....	900	34,485	17,130	17,355	12,929	21,556	38	147,100	0.26	0.41	60,404	23,946	0.40	570	190	67.0	27.0
Edgefield.....	1,200	45,844	23,006	22,838	16,018	29,826	38	234,141	0.30	0.40	93,797	35,894	0.38	543	181	78.0	30.0
Fairfield.....	900	27,765	13,714	14,051	6,885	20,880	31	173,899	0.30	0.40	60,807	25,729	0.37	528	176	78.0	29.0
Georgetown.....	900	10,613	9,406	10,117	2,466	16,147	22	22,154	0.04	0.02	362	160	0.44	627	209	0.4	0.2
Greenville.....	690	37,496	18,512	18,984	22,983	14,513	54	130,140	0.29	0.35	45,572	17,064	0.37	528	176	66.0	25.0
Hampton.....	800	18,741	9,434	9,307	6,286	12,455	23	68,438	0.13	0.32	21,624	7,711	0.36	513	171	27.0	10.0
Horry.....	1,100	15,574	7,802	7,772	10,632	4,942	14	29,141	0.04	0.06	1,773	809	0.46	657	219	2.0	0.7
Kershaw.....	900	21,538	10,045	10,493	7,892	13,646	24	68,628	0.12	0.42	28,978	11,280	0.39	555	185	32.0	13.0
Lancaster.....	600	16,903	8,416	8,487	7,935	8,968	28	82,858	0.22	0.31	30,744	12,677	0.41	585	195	51.0	21.0
Laurens.....	650	29,444	14,604	14,840	11,756	17,688	45	126,700	0.30	0.50	63,956	24,484	0.38	543	181	98.0	38.0
Lexington.....	1,100	18,564	9,110	9,448	11,096	7,468	17	87,780	0.12	0.26	22,871	9,050	0.40	570	190	21.0	8.2
Marion.....	1,100	34,197	16,793	17,314	15,881	18,226	31	132,513	0.10	0.34	45,520	21,748	0.48	634	223	41.0	20.0
Marlborough.....	540	20,598	10,214	10,384	8,026	12,572	38	87,429	0.25	0.47	41,251	23,785	0.58	828	276	70.0	44.0
Newberry.....	620	26,497	13,061	13,436	8,236	18,261	43	126,378	0.32	0.45	57,447	24,165	0.42	600	200	93.0	39.0
Oconee.....	550	10,256	7,879	8,377	11,955	4,301	30	55,834	0.16	0.24	13,595	3,818	0.28	399	133	25.0	7.0
Orangeburgh.....	1,400	41,395	20,583	20,812	12,942	28,453	30	199,025	0.22	0.31	61,354	24,452	0.40	570	190	44.0	17.0
Pickens.....	510	14,389	7,146	7,243	10,673	3,716	28	66,529	0.20	0.28	18,463	5,756	0.31	441	147	36.0	11.0
Richland.....	620	28,573	13,845	14,728	9,185	19,388	46	68,872	0.17	0.41	28,348	10,958	0.39	555	185	46.0	18.0
Spartanburgh.....	950	40,409	19,781	20,628	26,372	14,037	43	148,741	0.24	0.41	61,337	24,188	0.39	555	185	65.0	25.0
Sumter.....	900	37,037	18,342	18,695	9,979	27,058	41	134,895	0.23	0.43	57,958	22,469	0.39	555	185	64.0	25.0
Union.....	700	24,080	11,870	12,210	10,516	13,564	34	108,577	0.24	0.50	54,260	19,605	0.36	513	171	78.0	28.0
Williamsburgh.....	980	24,110	11,936	12,174	7,758	16,352	25	64,085	0.10	0.25	15,893	5,627	0.35	498	166	16.0	6.0
York.....	720	30,713	15,214	15,499	14,033	16,680	43	159,901	0.35	0.37	58,546	23,523	0.40	570	190	81.0	33.0

COTTON PRODUCTION IN SOUTH CAROLINA.

TABLE II.—ACREAGE AND PRODUCTION OF THE LEADING CROPS.

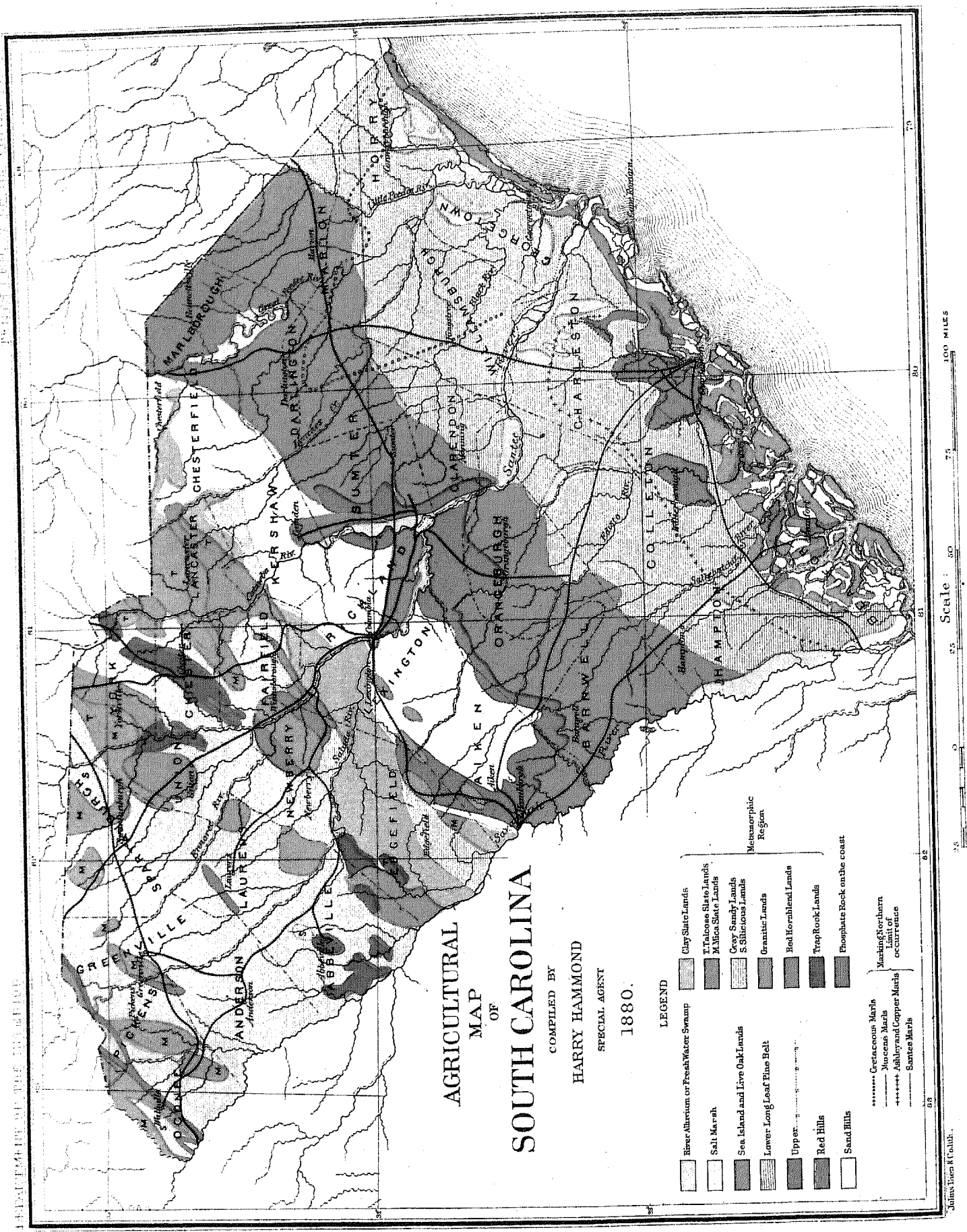
Counties.	COTTON.		INDIAN CORN.		OATS.		WHEAT.		SWEET POTATOES.		RICE.	
	Acres.	Bales.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Pounds.
The State.....	1,364,249	522,548	1,383,404	11,767,099	261,445	2,715,505	170,902	962,858	39,059	2,189,622	78,888	52,077,515
Abbeville.....	83,538	26,380	51,569	471,955	23,544	249,081	14,396	107,608	474	31,123	16	8,865
Alken.....	37,018	14,334	51,481	377,922	3,545	54,339	6,527	22,584	1,064	81,895	643	490,012
Anderson.....	61,060	21,897	49,956	492,646	12,776	94,613	16,754	101,950	526	36,550	53	33,357
Barwell.....	83,463	28,764	84,103	607,610	10,868	140,150	3,778	18,057	1,737	102,049	1,388	742,633
Beaufort.....	11,570	2,740	14,735	135,755	213	2,901			4,323	160,930	12,763	10,569,661
Charleston.....	24,802	9,303	29,569	279,983	1,773	23,996	16	198	3,821	170,534	12,035	8,963,198
Chester.....	52,324	19,651	40,469	357,303	10,440	97,583	7,342	35,768	103	7,005		
Chesterfield.....	18,480	7,733	27,223	247,430	4,640	41,646	2,549	10,320	938	27,199	14	5,155
Clarendon.....	26,687	8,589	32,310	222,274	2,345	28,777	125	624	1,237	59,196	1,828	691,357
Colleton.....	11,447	4,869	43,544	376,532	5,931	66,097	186	805	1,738	117,825	16,057	11,136,056
Darlington.....	60,404	23,946	58,557	440,892	8,317	88,216	2,593	13,453	1,917	116,096	1,090	453,764
Edgefield.....	33,797	35,894	67,825	559,086	36,432	415,243	11,323	67,841	1,085	70,756	3	660
Fairfield.....	69,897	25,729	40,274	367,930	7,581	86,566	4,012	24,511	934	53,855	5	3,620
Georgetown.....	362	160	4,389	44,161	205	3,741			590	49,674	11,665	10,627,889
Greenville.....	45,572	17,064	52,599	582,156	9,282	62,673	11,605	62,132	448	34,132	22	13,792
Hampton.....	21,624	7,711	30,825	227,884	5,325	58,595	23	147	827	84,250	3,083	1,407,380
Horry.....	1,773	809	13,391	163,895	157	1,057			2,177	155,880	1,781	747,680
Kershaw.....	23,978	11,288	21,891	219,957	2,849	34,402	1,509	6,355	772	30,802	529	126,482
Lancaster.....	30,744	12,677	29,622	204,939	6,697	48,385	3,777	16,852	247	14,117		
Laurens.....	63,956	24,484	45,086	381,933	15,860	140,410	9,864	62,243	369	24,207	1	720
Lexington.....	22,871	9,050	35,760	304,540	10,237	121,290	12,155	48,167	1,671	62,557	233	128,818
Marion.....	45,520	21,748	55,183	470,745	6,784	69,011	1,081	9,131	2,928	187,103	3,149	1,623,072
Marlborough.....	41,251	23,785	33,773	338,527	4,727	63,180	2,436	20,077	1,115	61,416	126	39,064
Newberry.....	57,447	24,155	34,605	315,863	13,994	177,962	9,258	64,136	513	38,437		
Oconee.....	13,595	3,818	23,224	268,899	4,727	39,392	4,265	26,017	171	11,381	12	3,945
Orangeburgh.....	61,354	24,452	66,419	529,259	9,727	140,473	3,529	15,685	1,176	65,674	6,245	2,052,249
Pickens.....	18,463	5,756	27,070	314,064	2,882	23,987	4,994	31,683	251	20,088	23	30,460
Richland.....	28,343	10,958	19,431	171,040	2,158	30,904	514	3,916	726	30,816	233	104,121
Spartanburgh.....	61,337	24,188	56,225	593,454	11,267	74,572	14,806	79,991	340	22,168	5	3,356
Sumter.....	57,958	22,469	51,376	442,360	5,886	64,581	460	2,644	2,191	96,396	1,952	669,592
Union.....	54,260	19,605	36,710	379,336	5,562	42,040	6,710	33,951	329	21,336		
Williamsburgh.....	15,808	5,627	30,291	220,311	1,070	9,860	78	409	1,773	91,414	3,428	1,459,410
York.....	58,546	23,523	51,532	626,505	13,824	119,882	14,175	75,173	548	34,155	1	640

PHYSICO-GEOGRAPHICAL AND AGRICULTURAL FEATURES
OF THE
STATE OF SOUTH CAROLINA.

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Part of the Census



OUTLINE OF THE PHYSICAL AND AGRICULTURAL FEATURES

OF THE

STATE OF SOUTH CAROLINA.

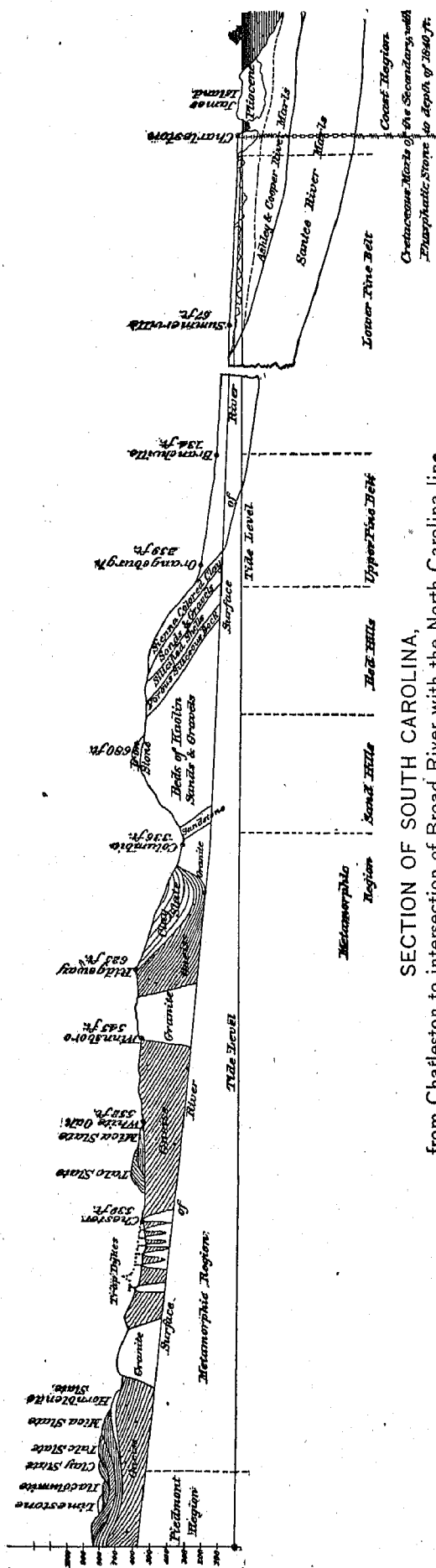
The state of South Carolina lies between north latitude $32^{\circ} 4' 30''$ and $35^{\circ} 12'$ and longitude west from Washington $1^{\circ} 30'$ and $80^{\circ} 54'$. Its total area is estimated at 30,570 square miles, embracing 30,170 of land and 400 of water surface, being about three-fifths the size of England and Wales. Of this area, some 7,500 square miles consist of improved lands; the remaining 22,670 square miles are in forests, swamps, and marsh, almost all of which may be easily reclaimed and improved, most of it being naturally by far the most fertile land in the state.

The state approaches in shape the form of an isosceles triangle, the equal sides being on the north, the boundary line of North Carolina, and the Savannah river separating it on the south and west from Georgia. The apex of the triangle rests upon the summits of the Blue Ridge mountains. The base, sweeping with a gentle S-shaped curve from the southwest to the northeast, forms part of the great Atlantic shore line of North America. This line is parallel, or nearly so, with about one-half the coast lines of the continents of the earth.

Parallel with this coast line also trend the divisions between the various geological formations of the state. First, extending not more than ten miles inland, we have the strata of the post-Pliocene resting on the formations of the Eocene. These, with here and there a patch of the Miocene and of the Cretaceous, stretch back into the interior about one hundred miles, until they reach the crystalline rocks, whose well-marked line has, during the entire past history of the state, divided it socially, politically, and industrially, as well as physically, into what has always been known as the "up-country" and the "low country" of Carolina. This division of the state by the line bounding the southern margin of the crystalline rocks trending northeast and southwest across its central portion is strongly marked in everything—in the hills and highlands of the up-country with their heavy red-clay soils, and in the gentle slopes or wide flats of lighter-colored sandy loam of the low country; in the rapid, turbid water-courses of the one, and in the slow, clear currents of the other; in the vegetable growth, the chestnut, the deciduous oaks, and the short-leaf pine occupying the up-country, and the long-leaf pine, the magnolia, and the evergreen oaks, with the long gray moss (*Tillandsia*), marking the low country; and lastly, in the manners, character, ancestry, and even in the very tones of voice of the inhabitants. Passing beyond the lower margin of the crystalline rocks and proceeding toward the mountains we find in all the various strata, in the order of their superposition—one above the other, the limestone, the itacolumite, the clay talc and mica slates, the gneiss, and the granite—that the same parallelism is maintained throughout, the prevailing strike in all being N. 20° to 30° E. If we regard the movements of the atmosphere, we find here also that the predominating currents of the air move in a northeast and southwest direction.

RIVERS.—Perpendicular to this direction—that is to say, in a southeasterly course—the four great rivers, with their numerous tributaries that drain and irrigate South Carolina, make their way from the mountains to the sea. Before leaving the crystalline rocks—the point that marks their lower falls and the head of steam navigation—the rivers have received the rapid currents of nearly all their affluents. Thereafter their stately flow proceeds more slowly, passing the great inland swamps of the low country as if the waters still remembered when they found issuance through these ancient deltas. As each river leaves the region of rocks to enter the borders of the low country, it makes a sudden and well-marked detour eastward, except the Savannah, which seems to have had its bed shifted westward at this line of demarkation.

Again, on the near approach of the rivers to the sea, some of them show a deflection westward. But the parallelism previously noticed does not obtain in this case. In some, as in the Pedee, the westward bend is well marked. In others, as in the Edisto, the river is merely turned from an eastward to a north and south course;



SECTION OF SOUTH CAROLINA,
from Charleston to intersection of Broad River with the North Carolina line.

while the Santee seems scarcely at all diverted from its eastward course. It would not seem, therefore, as if this change had resulted from the action of any single cause, but rather that it was the resultant of opposing forces operating with varying intensities. Such forces would be found in the southeasterly currents of the streams themselves opposed by that southwesterly ocean current, a recurrent of the Gulf Stream, that sweeps along the Carolina coast. Where a river current was strong, and loaded with a wealth of detritus from the drainage of an extensive back country, it would hold its own against the ocean current, dam it out, and establish for itself the direction of its outlet. Hence the Santee piles up its banks and carries the shore-line out beyond cape Saint Romain, and all the coast southwest of it, the site of ancient and of actual deltas, is lined with the islands. Short and sluggish streams, however, supported by the detritus of no great water-shed, as the Waccamaw and Pedee rivers, would yield readily to the action of the ocean currents, conform to their direction, establish no nests of islands at their delta, but leave the sea to make a smooth, bare sand beach; such as the curving shore from Georgetown entrance to the North Carolina line, where, for twenty miles on a stretch, a carriage may roll along the beach at low water, leaving in the hard sands not the slightest impress of its wheels. The westward shifting of the channels of these streams is still going on, and is clearly recognizable on the charts of the Coast Survey in the deposition of sediment taking place at the mouths of all the rivers on this coast. The ship channels all lie to the south of the entrance to the harbors.

Crossing the crystalline rocks nearly at right angles, the waters in their course through the up-country encounter a series of natural dams, which, while it renders them easily available as water-powers, seriously obstructs navigation. The passage of boats of, say, two hundred tons burden, as a rule, reaches inland but very little further than the remarkable belt of high and healthy sand hills which lie along the lower borders of these rocks. But through the virgin forests of pine that cover the slopes and summits of these hills a water-power, measurable only by hundreds of thousands of horse-power, wastes itself away, unsubjected to the uses of man.

The tortuous courses into which the streams have been forced by the causes already stated, after entering the low country, while it has increased the navigable waters of the state, (giving, "apart from creeks and inlets of the sea, an inland navigation of 2,400 miles,") has seriously impeded the drainage of the low country, creating there some 5,500 square miles of swamp lands, which, though naturally, when reclaimed, of almost inexhaustible fertility, remain to this day for the most part waste, the prolific source of the miasms so deleterious to the health of this region. Numerous suggestions to remedy this evil have been made; but as yet nothing has been attempted on a scale commensurate with the importance of the undertaking. The legislature even refused, in 1846, to grant a charter to a company proposing to prolong the channel of the Edisto in a direct line through Wassamassaw swamp to the Ashley river; and a suggestion of a similar character made by Governor Seabrook, in 1848, for straightening the Santee through to the Cooper river and draining thereby Biggin, Fair Forest, Walleye, and the numerous adjacent swamps, met with no response. Such works would have reclaimed for the plow large bodies of soil, consisting of fine mud and decomposing vegetable matter resting at a depth of 5 to 10 feet on marl or gravel, and would have restored the adjoining uplands to remunerative culture, and established on a secure foundation the healthfulness of the entire region.

covering the entire surface, but worn away long ago under the erosive action of the present river system of the state. Numerous gold mines, and veins bearing copper, lead, and silver, have been found in these rocks and, to a limited extent, worked. The iron furnaces of Cowpens and Hurricane Shoals are also located in this formation. Mica of excellent quality has been mined in Dark Corner township, Anderson county, and in Abbeville. In the former locality beryl and copper are also found. Corundum and zircons are found in Hall township, Abbeville county, and in other localities. Asbestos occurs near Glenn Springs, Spartanburgh county, a noted health resort, the curative virtues of whose waters, with those of many other similar springs in this region, are due to the minerals dissolved from these mica-schists.

Next in the order of superposition above the mica slates occur extensive areas of talc slate. These rocks seem to have yielded even more completely to the erosive action of the rivers. They scarcely appear at all in the angle inclosed between the Catawba and the Saluda. Their largest outcrops are east of the Catawba, in Lancaster and Chesterfield counties, and separated from these by the whole width of the river system of the state, 80 miles to the southwest, across the Saluda, in Edgefield and Abbeville counties. These two localities are the great gold-bearing regions of the state.

On Broad river, near the northern boundary, where the counties of Union, York, and Spartanburgh corner, an interesting series of rocks occur, the most peculiar of which is a flexible sandstone, the itacolumite or diamond-bearing rock that gives its name to the group under the designation of the itacolumitic series. Thus far only one diamond has been found in South Carolina, though several have been obtained from the continuation of these rocks both in Georgia and in North Carolina.

South of the rocks above mentioned, and extending along the edge of the Tertiary from Edgefield to Chesterfield, a broad belt of clay slates occur. On their southern border among the sands of Lexington and Chesterfield counties, or just north of the granite in Kershaw, Richland, and Edgefield, these clay slates dip from 14° to 18° northwest. This angle increases further north until the slates stand vertically; still further on the dip changes to the southeast.

The trappean rocks are found chiefly on two lines. The principal one is the most southerly, and extends from Edgefield across to where the Catawba river enters the state. Their trend is a little more to the north of east than that of the other strata, which they therefore cross at an angle. Their greatest development is in Chester and York, where they form the substratum of a large body of very peculiar lands known as the "black-jack" lands. These trappean rocks show themselves along another line parallel with this one and to the north of it, stretching from Calhoun's Mills, in Abbeville, to the Lockhart shoals on Broad river, in Union. Here they also give rise to a peculiar body of lands known as the "flatwoods" of Abbeville and the "meadow lands" of Union.

Cretaceous.—Outcrops of the rocks of the Cretaceous formation occur east of the Santee river in numerous localities in the lower pine belt of South Carolina. Commencing at Little river, in the southeastern corner of Horry county, Professor Tuomey followed these rocks to Mars bluff, on the Great Pedee, and to points as far north as Darlington Court-House. They make their appearance on Lynch's river in about the same latitude, and were traced by Mr. Ruffin as far west as Kingstree, the county-seat of Williamsburgh. They consist of a soft marl, of a dark-gray color, containing, as at Mars bluff, the remains of *Belemnites* in great number. This marl averages about 34 per cent. of carbonate of lime, and rests on a stratum of hard lime or marl-stone, which yields 75 per cent. of carbonate of lime. This marl-stone rests on a black shale of laminated clay, which overlies beds of sand.

Tertiary.—The several divisions of this formation are represented in the state, the lowest—Eocene—being the most extensive, and may also be subdivided into several groups, viz, *sand hills*, with clays and recomposed granites, *buhr-stone*, *Santee marls*, and *Ashley and Cooper marls*.

Sand hills.—On the south of the metamorphic there is a belt of sand hills that form a dividing ridge between the more recent formations of the *low country* and the very ancient formations of the *upper country*. Their southern aspect overlooks the Tertiary plain descending to the sea-shore of the Atlantic. On the north they reach the clay slates (themselves dipping north of Edgefield, Lexington, Richland, and Chesterfield counties) and the granite and gneiss rocks of Kershaw county. Outcrops of these most ancient rocks also occur among the sand hills themselves.

Above the granite on Horse creek, in Aiken county, is found a sandstone composed of the ruins of granite consolidated into a pretty hard rock, thick ledges of which occur on the tops of the ridges in a number of localities. On Second creek, in Lexington county, Professor Tuomey found fragments of bones embedded in this sandstone, and recognized fossil shells belonging to the Eocene formation.

Interstratified with this sandstone are beds of loose sand, kaolin clay, and other variously colored clays having a vertical thickness estimated by Tuomey at 150 to 200 feet. Beds of pure white quartzose sand, well adapted for the manufacture of glass, occur. Quarries in the beds of kaolin have been opened in Aiken county and worked with much profit, both for the manufacture of porcelain and as an article shipped in quantities to northern markets.

Superimposed on the beds of loose sand and clay, in which no fossils are reported, is a siliceous rock, varying from a laminated siliceous clay to a hard rock having a jointed structure, breaking with a conchoidal fracture and resembling *menillite*. This curious rock has been traced from Aiken Court-House to the northern part of Clarendon county—where it is known as fuller's earth—nearly encircling the Charleston basin. On Congaree creek it is saved into blocks, fashioned with an ax, and used in building chimneys. It hardens on exposure, resists disintegration,

well, and its extreme lightness facilitates its carriage and handling. On this rock rest beds of silicified shells and masses of buhr-stone rock belonging to the earlier Eocene. Over all are spread beds of fine sand, covered here and there by beds of iron ore or ferruginous sandstone sometimes from 3 to 6 feet in thickness.

The region of red hills, which lies south of the sand hills, belongs to the buhr-stone formation of the Eocene. A sienna-colored clay loam forms the subsoil of this region. It rests on strata of siliceous clay and silicified shells. The clay rarely exceeds 20 feet in thickness and is underlaid by beds of coarse sand, gravel, buhr-stone, and kaolin clays. These kaolin clays appear at the surface in the sand-hill region, resting on beds of sandstone and grit, that cover the Horse creek granites, which extend, with the sand hills north of the region under consideration, from Graniteville to Columbia.

The *buhr-stone* is the lower and underlying member of the series of calcareous rocks forming the Charleston basin. It has been altered where it stands by the removal of the lime from the shells of which it is composed, and by the substitution of silica in its stead. Not only has the buhr-stone been traced by Professor Tuomey under the Santee marls, but the shells characteristic of these marls have been found in numerous localities in process of petrification.

No Eocene marl is found north of this ancient sea beach represented by the lower line of the buhr-stone formation. Masses of buhr-stone occur in numerous localities, sometimes showing a thickness of 30 feet. Quarries for millstones (said to equal the best French buhr-stone) have been opened and worked in these rocks. In Orangeburgh county, between the laminae of clay, very distinct impressions of the leaves of the oak, beech, and willow are found. Petrified wood, frequently, as the trunks of large trees in considerable numbers, is found imbedded in the branches of this region. In Aiken and Chesterfield counties beds of lignite are known. They are underlaid by a clay shale, pronounced by Lieber equal to the best Stunbridge clay for fire-proof crucibles.

The body of the lower pine belt is underlaid by marl belonging to that portion of the Eocene formation of the Tertiary designated by Mr. Ruffin the Great Carolinian Belt. These marl-beds are divided into two well-marked groups, known as the Santee marls and as the Ashley and Cooper river marls. The Santee marls are the older, lower, and more extensive formation. Reaching from Mazyck's ferry, on the Santee river, in Charleston county, to Vante's ferry, on that river, in Orangeburgh county, and underlying nearly the whole of Clarendon county, they have been traced along Potato creek as far north as Sumter county. Westward they extend through Colleton Orangeburgh, Hampton, and Barnwell counties to the Savannah river, reaching as high up on that stream as Shell Bluff, a noted locality in Burke county, Georgia.

West of the Black river, in Sumter county, the line where the buhr-stone formation passes under the Santee marls traverses the center of the upper pine belt. North of it occur the silicified shells of the buhr-stone, south of it the coralline marls, both belonging to the Eocene Tertiary. West of the stream named, and in the direction of Darlington Court-House, occur numerous outcroppings of the Miocene marls, in Sumter and Darlington counties.

The Santee marl-bed forms the lowest member of the calcareous strata of the Charleston basin, and was designated by Professor Tuomey "the coralline bed of the Charleston basin", being composed of the remains of corals and gigantic oyster shells. It consists of strata of soft marl, marlstone, and greensand, and is very rich in carbonate of lime, averaging 90 per cent. of that valuable ingredient of the soil. The greensand marls, intercalated with them, contain 30 per cent. of carbonate of lime and 22 per cent. of greensand.

The marls of Sumter and Darlington examined by Professor Tuomey were found to contain from 60 to 70 per cent. of carbonate with traces of phosphate of lime.

Resting on the Santee marls, and passing out with them beneath the Pliocene and post-Pliocene of the coast under the sea to a great depth, are the Ashley and Cooper marls. Unlike the Santee marls, they contain neither corals nor oyster shells, but are composed of minute many-chambered shells (*Polythalamia* and *Foraminifera*). These marls are of a dark-gray color and granular texture, sometimes so compact as to render the material suitable for building purposes. They are not so rich as the Santee marls, and average only about 60 per cent. of carbonate of lime. They have long been known, however, to contain a notable quantity of phosphate of lime, and a great interest attaches to them, as they are the source of the nodules rich in phosphate of lime known as *phosphate rock*.

Phosphate rock.—The deposits of phosphate rock occur over a wide range of country, reaching from North Carolina to Florida, and extending in some instances as much as 60 miles inland. Vertically, so far as their occurrence in quantities of value economically is concerned, their distribution is confined within narrow limits. They are found at the bottom of rivers at a depth of from 20 to 30 feet, and on land they occur at an elevation but slightly above mean high tide, so that the tides of the existing sea, supplemented in a few instances perhaps by the action of storms, are sufficient to account for any movements that these water-worn nodules have undergone. The rock of commerce occurs always above the marl, and is known as the land or water rock, according as it is found in the one element or the other. The water rock is darker in color and harder than the land rock, and is frequently found in a layer or sheet of cemented or tightly-compacted nodules overlying the marl at the bottom of the rivers and creeks, where it either forms the bottom itself or is overlaid by a deposit of mud of greater or less depth. It has been seldom dredged for at a depth exceeding 20 feet. The land rock is found at a depth of from 2 to 10 feet (and more under elevations) below the surface of the soil, but is not mined at a depth exceeding from

5 to 7 feet. It is found in masses or nodules varying from the size of a potato to several feet in diameter. These nodules are rounded, rough, indented, and frequently perforated with irregular cavities. They vary in color from olive or bluish black to a yellowish or grayish white. The specific gravity is from 2.2 to 2.5; the hardness from 3.5 to 4. The fragments of rock give off a peculiar fetid odor on friction. By analysis it is found to contain—

	Per cent.
Phosphate of lime	55 to 61
Carbonate of lime	5 to 10
Organic matter and water	2 to 10

with small quantities of fluorine, iron, magnesia, alumina, and sulphuric acid, beside sand. The land rock is found in a loose layer varying from a few inches to 30 in depth, averaging about 8 inches. It occurs in sand, mud, clay, or peat, and is often intermingled with numerous remains of land and marine animals. Among the former are the remains of the mastodon, elephant, tapir, deer, and of our domestic animals the horse, the cow, and the hog; thus showing that these very animals, which were imported by the first white settlers, had once inhabited this region, from which they had disappeared, so far as tradition informs us, before the advent of man, furnishing Professor Agassiz with one of his strongest arguments in favor of "independent centers of creation". The remains of these land animals are found intermingled with, but never imbedded in, the phosphate rocks, giving no evidence that there was any community of origin between them. So abundant are the remains of marine animals that Professor Tuomey named this formation the "Ashley fish bed". Most striking among these remains are beautifully preserved teeth of sharks from 2 to 4 inches in length.

As to the origin of the phosphate rock, the identity of the fossil shells it contains with those of the underlying marl make it certain that it consists of fragments broken from the irregular surface of the marl, and that its rounded and nodular form was imparted to it by the action of the waves and currents to which it was subsequently subjected. The important question of how a marl containing originally 60 per cent. of carbonate of lime and from 2 to 4 per cent. of phosphate of lime, has been changed into one containing from 5 to 10 per cent. of carbonate and from 50 to 60 per cent. of phosphate of lime remains for consideration, and several theories have been advanced. Layers of phosphate rock have been found at a depth of 300 feet in artesian borings, and the causes may be still in progress as the dredging work of the United States Coast Survey shows that the marls are accumulating at a depth of 200 fathoms on the floor of the Gulf stream between Florida and Cuba, and contain a considerable percentage of phosphate of lime.

No systematic survey, determining the extent of these deposits, has yet been attempted. The only information on this head comes from prospectors seeking easily accessible rock in localities convenient for shipment. Widely-varying estimates as to the quantity of the rock have been ventured. Some have placed it as high as 500,000,000 of tons, and others as low as 5,000,000. The latter is the estimate of Professor Shepard, who has prepared a map of the region. He traced the deposit over 240,000 acres, and roughly estimates the accessible rock as covering only about 10,000 acres. Even this estimated area, at 800 tons per acre, which he gives as an average, should yield 8,000,000 tons. But if we examine a single mining region, as that for instance occupied by the Coosaw Company, we must conclude that he has very greatly underestimated the amount. This company has the exclusive right to a territory of about 6,000 acres on Coosaw river, beside the adjacent marshes yet unexplored. Everywhere the river bottom is covered with rock, which for the most part forms a solid sheet, varying from 8 inches to 1½ feet in thickness. Taking the lesser thickness, we have, with a specific gravity of 2.5, after subtracting 25 per cent. for loss in washing and drying, something over 1,700 tons to the acre, which would give for the river territory alone belonging to this one company something more than 10,000,000 of tons. It seems remarkable that while coal mining at great depths is found profitable, when the product sells at \$3 per ton, capital has not more eagerly sought employment in these superficial deposits worth never less than \$5 and now \$9 per ton.

There are ten companies engaged in land mining. The land either belongs to them or is leased by them for a term of years. Parallel ditches two yards wide are sunk through the soft soil to a depth of from 4 to 7 feet to the stratum of sand or mud in which the loose layer of phosphate nodules is found. The rock is shoveled out, thrown into heaps, and transported by rail to the washers situated on the wharves, whence it is shipped. A common laborer will raise a ton a day, for which he is paid \$1 75. The product of the land rock is about 100,000 tons a year, and most of it is ground and manufactured into acid phosphates and other fertilizers by the eight manufacturing companies within the state.

The river miners work under charters from the state, which grants them a general right to work a specified territory with any other comers, or exclusive right to such territory. In either case they pay a royalty to the state of \$1 for every ton of rock raised. The river works yield about 100,000 tons of rock per annum. Being harder, and therefore more difficult to grind, it has been mostly shipped to foreign or northern ports to be manufactured. Labor receives good wages at this work. Divers, raising the rock from a depth of 10 or 12 feet, paid by the amount raised, working one and a half hours on the ebb and one and a half on the flood tide, earn as much as \$18 a week. This work is neither dangerous nor unhealthy, and those engaged in it seem to enjoy their aquatic exercise. It is thought that large quantities of rock underlie the salt marshes between the high- and low-water mark. So far very little work and no thorough exploration has been made in this direction. The total amount of rock raised from the 1st of June, 1874, to the 1st of June, 1880, is given as 1,078,995 tons.

AGRICULTURAL DIVISIONS OR REGIONS.—In addition to the two grand divisions of South Carolina already dwelt upon, *i. e.*, the "up-country" and "low country", it will facilitate the consideration of the agricultural characteristics of the state to treat of them under certain minor, natural, and parallel subdivisions, which are quite well marked. These are as follows:

I. *The coast region.*—It coincides very nearly with the post-Pliocene formation, rarely extending inland more than 10 miles from the shore-line. It consists of—

(1) The sea islands lying south of Santee river, and containing about 800 square miles.

(2) The salt marshes uncovered at low tide, bordering and intercalating with the sea islands, capable of being reclaimed, and embracing 600 square miles.

(3) The continuous shore-line north of Santee river and Georgetown entrance, 300 square miles in extent.

II. *The lower pine belt or Savanna region, lying inland and parallel with the coast region.*—It has a width of about 50 miles, attains a maximum elevation above the sea of 130 feet, and covers 7,000 square miles. It is underlaid by the Eocene formation, and includes the Charleston basin, consisting of the marls of Santee and Ashley rivers. It may be divided into—

(1) The region below the influence of the tides, the rice fields of South Carolina.

(2) The region above tide-water, notable for its turpentine farms and its great cattle ranges.

III. *The upper pine belt or central cotton belt, having a width of 20 to 40 miles, embracing 4,500 square miles, and covered with a growth of long-leaf pine, mixed with oak and hickory.*—The soil consists of a light sandy loam, underlaid by red and yellow clays. It has an elevation above the sea of from 130 to 250 feet.

IV. *The alluvial lands.*—Large inland swamps, bays, and river bottoms of unsurpassed fertility, covering 5,500 square miles, interspersed among the two regions last named.

V. *The sand-hills region, lying immediately north of No. III.*—A remarkable chain of sand hills, attaining an elevation above the sea of from 600 to 700 feet, and extending across the state from Aiken to Chesterfield counties. These sand hills, with their heavy pine forests, and terebinthinate atmosphere, so much sought after as a specific for lung diseases, cover 4,060 square miles, and embrace two other formations of much interest agriculturally, viz:

1st. The red hills, lying, if anything, below the sand-hill belt, having a heavy oak growth and a red clay soil, with an elevation above the sea of from 500 to 600 feet, and covering some 1,200 square miles.

2d. The ridge lands, north and west of the sand-hill belt, and lying higher; soil, a gray sandy loam on clay subsoil; area, 400 square miles.

This formation belongs to the Eocene buhr-stone, with here and there outlyers of granite rock; its northern margin rests on the metamorphic rocks.

VI. The region of the *metamorphic rocks* is next reached. It includes that portion of the state known as the upper country, covers some 11,000 square miles, and has a mean elevation above the sea-level of from 600 to 800 feet. Its soils are:

1. The cold gray lands overlying chiefly the clay slates.

2. The gray sandy soils from the decomposition of granite and gneiss.

3. The red lands.

* 4. The trappean soils, known as flatwoods, meadow, or black-jack lands, in various sections.

VII. The *Piedmont belt* is the extreme northwestern extension of the rocks and soils of the region just mentioned, differing from the former by its more broken and mountainous character, and by its greater elevation, ranging from 900 to 3,430 feet at mount Pinnacle, near Pickens Court-House, the highest point in the state. It includes about 1,250 square miles.

AGRICULTURAL RETROSPECT.—The first permanent settlers established themselves on the sea-coast of South Carolina in 1670; bringing with them the traditions of a husbandry that must have been very rude at a period so long antedating the Tullian era of culture, and adapted solely to the requirements of colder latitudes. They met with such poor success in the cultivation of European cereals that they soon found it would be more profitable to employ themselves in collecting and exporting the products of the great forests that surrounded them. In return for the necessities of life, they exported to the mother country and her colonies oranges, tar, turpentine, rosin, masts, potashes, cedar, cypress, and pine lumber, walnut timber, staves, shingles, canes, deer and beaver skins, etc. (a) With the settlement of the up-country the culture of small grain became more successful, and when Joseph Kershaw established his large flouring-mills near Camden, in 1760, flour of excellent quality was produced in such abundance as to become an article of export of considerable consequence. In 1802, flouring-mills had proven so profitable that quite a number were established in the counties of Laurens, Greenville, and elsewhere. About that time, however, the attractions of the cotton crop became so great as to divert attention from every other; and the cereals lost ground until the low prices of cotton prevailing between 1840 and 1850 prepared the way for a greater diversity of agricultural industries, and the small-grain crop of 1850 exceeded 4,000,000 bushels. Since then cereal crops have declined, and seem likely to continue to do so unless the promise held out by the recent introduction of the red rust-proof oat should be fulfilled, and restore them to prominence.

In 1693, Langrave Thomas Smith—of whose descendants more than 500 were living in the state in 1808 (a number doubtless largely increased since)—introduced the culture of rice into South Carolina. The seed came from the island of Madagascar, in a vessel that put into Charleston harbor in distress. This proved a great success; and as early as 1754 the colony, besides supplying an abundance of rice for its own use, exported 104,682 barrels. Great improvements in the grain were made by a careful selection of the seed. Water culture was introduced in 1784 by Gideon Dupont and General Pinckney, rendering its production less dependent on the labor of man or

a In 1860 there was exported from Charleston 311,000 barrels of naval stores, and 14,500,000 feet of lumber, besides the large exports of these articles from Port Royal and Georgetown.

beast than that of any other cultivated crop. In 1778, Mr. Lucas established on the Santee river the first water-power mill ever adapted to cleaning and preparing rice for market—the model to which all subsequent improvements were due—greatly diminishing the cost of this work. In 1828, 175,019 tierces were exported, and the crop of 1850 exceeded 250,000 tierces. That of 1860 was something less; and in 1870 the product tumbled headlong to 54,000 tierces.

Indigo.—In 1742, George Lucas, governor of Antigua, sent the first seeds of the indigo plant to Carolina, to his daughter Miss Eliza Lucas (afterward the mother of Charles Cotesworth Pinckney). With much perseverance, after several disappointments, she succeeded in growing the plant and extracting the indigo from it. Parliament shortly after placed a bounty on the production of indigo in British possessions; and this crop attained a rapid development in Carolina. In 1754, 216,924 pounds, and in 1775 1,107,660 pounds were produced. But the war with the mother country, the competition of indigo culture in the East Indies, the unpleasant odor emitted, and the swarms of flies attracted by the fermentation of the weeds in the vats, but above all the absorbing interest in the cotton crop, caused its rapid decline; and in the early part of this century it had ceased to be a staple product, although it was cultivated in remote places as late as 1848.

Indian corn.—Indian corn, the grain which, "next to rice, supplies food to the largest number of the human race," "the most valuable gift of the new world to the old," but a plant unknown to European culture, and in ill-repute as the food of the ever hostile red man, received little attention from the early settlers. Nevertheless, with the steadiness that marks true merit, it worked its way to the front rank among the crops grown in the state. As early as 1739 it had become an important article of export, and continued such until after 1792, in which year 99,985 bushels were exported. About this time, in consequence of the absorption by cotton of all surplus energy, it fell from the list of exports and shortly after entered that of imports, among which to-day—taken in all its forms—it stands by far the largest. But its culture was by no means abandoned; on the contrary, the crop grew in size with the increase of the population. In 1850 more than 16,000,000 bushels were produced. In consequence of the higher prices of cotton, the crop was reduced in 1860 by 1,000,000 bushels; in 1870 it had gone down one-half, having fallen to a little over 7,500,000 bushels.

Cotton.—Cotton is mentioned in the records of the colony as early as 1664, and in 1747 seven bags appear on the list of exports from Charleston. In 1787, Samuel Maverick and one Jeffrey shipped three bags of 100 pounds each of seed-cotton from Charleston to England as an experiment, and were informed for their pains by the consignees that it was not worth producing, as it could not be separated from the seed. In 1790, a manufactory of cotton homespun was established by some Irish in Williamsburgh county, the lint used being picked from the seed by hand, a task of 4 pounds of lint per week being required of the field laborers in addition to their ordinary work. All this speedily changed with the invention of the saw gin by Eli Whitney, in 1794. The first gin moved by water-power was erected on Mill creek, near Monticello, in Fairfield, by Captain James Kincaid, in 1795. General Wade Hampton erected another near Columbia, in 1797, and the following year gathered from 600 acres 600 bales of cotton, and cotton planting became the leading industry in nearly every county in the state. The crop steadily increased in size until 1860, when the 350,000 bales produced in the state were worth something over \$14,000,000. From this date to 1870 there was a great decline, the crop of that year being more than one-third less than the crop of ten years previous, and reaching only 224,500 bales. The course of this crop may be seen from the following table showing the crops of South Carolina:

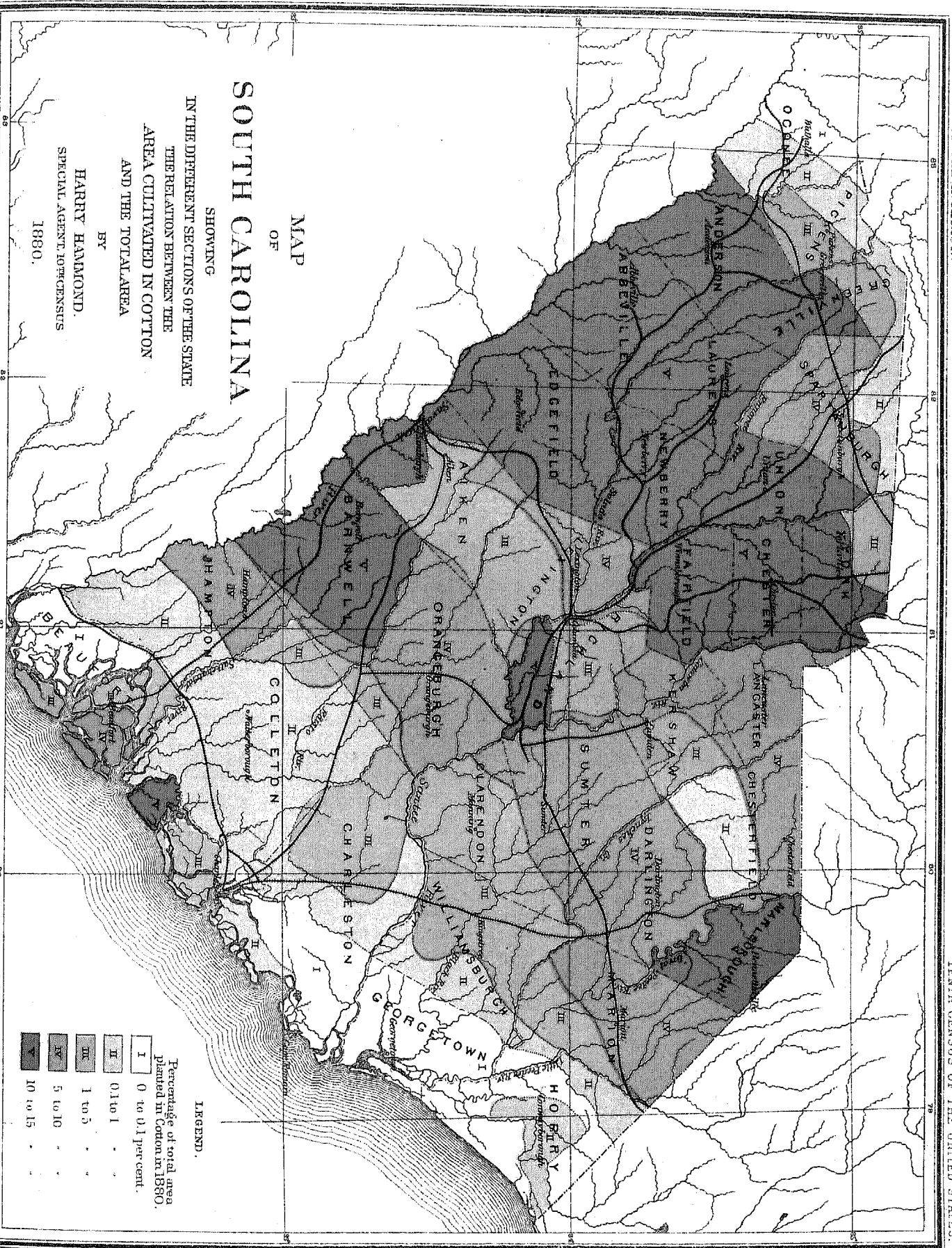
Year.	Bales.	Weight of bale.	Pounds of lint cotton.
1830.....	*185, 166	341	63, 446, 606
1840.....	156, 600	394	61, 710, 274
1850.....	300, 301	429	128, 829, 129
1860.....	353, 412	477	168, 577, 524
1870.....	224, 500	442	90, 229, 000
1880.....	522, 548	475	248, 210, 300

* Round bales.

Sea-Island cotton.—The first crop of sea-island cotton was raised on Hilton Head, in 1790, by William Elliott. This crop reached its year of maximum production in 1827, when 15,140,798 pounds of long-staple cotton were exported from the state; in 1841 it had fallen to 6,400,000 pounds. Since 1865-'66 this crop has fluctuated from a minimum, in 1867-'68, of 4,577 to a maximum, in 1872, of 13,186 bales. The crop, including the long-staple Mains and Santees, is set down at 9,966 bales, averaging 331 pounds, for the year 1880.

Even in so brief a summary as this, the attention of the reader must be called to the remarkable influence exerted on the three great crops, corn, cotton, and rice, by their culture on the South Carolina coast.

The finest, as food for man, of all the known varieties of corn is the white flint corn, a product peculiar to the sea islands.



MAP OF SOUTH CAROLINA

SHOWING
IN THE DIFFERENT SECTIONS OF THE STATE
THE RELATION BETWEEN THE
AREA CULTIVATED IN COTTON
AND THE TOTAL AREA
BY
HARRY HAMMOND.
SPECIAL AGENT 10TH CENSUS
1880.

LEGEND.

Percentage of total area
planted in Cotton in 1880.

I	0 to 0.1 per cent.
II	0.1 to 1
III	1 to 5
IV	5 to 10
V	10 to 15

Scale: 0 25 50 75 100 MILES

The finest cotton ever known to have been produced is the long-staple cotton of Edisto island, which has sold for \$2 per pound when other cottons were bringing only 9 cents.

Carolina rice heads the list in the quotations of that article in all the markets of the world. Not only have its yield and culture been brought to the highest perfection here, but mankind are indebted to the planters of this coast for the mechanical inventions by which the preparation of this great food-stuff, instead of being the most costly and laborious, is made one of the easiest and cheapest.

THE COAST REGION.

The coast of Carolina, from the mouth of the Savannah river to that of Little river on the North Carolina line, is about 190 miles in length. East of the outlets of the rivers, that is, northeast of Winyaw bay, the coast-line curves inland, there are no islands, and the smooth hard beach that forms the continuous shore-line—noted for its delightful seaside residences during the summer months—is of little interest agriculturally. South of Winyaw bay, whence issue the waters of Black and Lynches river, and of the Great and Little Pedee with the Waccamaw, the Santee river, with its great water-shed in North and South Carolina, draining an extensive region stretching to the highest elevations of the Appalachian range, dikes out its delta into the waters of the ocean; the shore-line swells out toward the sea and becomes lined with numerous islands. From the point indicated to Charleston harbor, however, the islands, though numerous, are small and low; and in this distance of more than 50 miles, not more than 700 acres are planted in cotton, yielding about 275 bales of long staple. South of Charleston harbor the islands increase rapidly in size and number to the waters of Port Royal, where they line the shore in tiers three and four deep. They attain their maximum development around Broad river and diminish again in size and number, more rapidly even than they had increased, as they approach the Georgia line at the mouth of the Savannah river.

The coast region corresponds almost exactly with the area underlaid by post-Pliocene formation. It embraces nearly all of Beaufort county, comparatively small portions of Colleton and Charleston, and but very narrow strips of Georgetown and Horry counties. Its strata of sand, clay, and mud have an estimated thickness of about 60 feet, stretching inland some 10 miles, and thinning out at a slight elevation above tide-water. They rest in Horry and Georgetown on the Pliocene, and for the remainder of the coast on the Eocene, in which occur the phosphate deposits of the Ashley, the Cooper, and the Coosaw rivers:

The *origin and formation* of the sea islands may be accounted for by one of four possible suppositions:

1. By the subsidence of the coast, resulting in the submergence of the lower lands. This explanation was offered by Sir Charles Lyell.
2. By the erosive action of the tides and currents of the sea cutting into the shore and detaching portions of the mainland; a theory broached by Professor Shaler.
3. By an outgrowth of the land into the sea, resulting from the deposition at the mouths of the rivers of the detritus brought down by their currents from the interior.

Professor Tiomey shows in detail that the instances of the submergence of live-oak, pine, and cypress trees and of other landmarks occur in localities of restricted area; that encroachments of a purely local character by the sea after storms explains the phenomena; and that if it were admitted that the submerged live-oak and pine stumps near Little River, or the dead cedars and cypress of the "church flats" at Wadmalaw, was evidence of a settling down of the coast, the rate at which this is progressing according to these data is so rapid, that on this low-lying shore sea-water would long since have been admitted to the rice plantations, totally destroying them.

That the sea islands have not resulted from the erosive action of the sea is proved by the fact, however, that there is not a single island on the incurving line of eroded coast north of Winyaw bay. On the contrary, it is only where the land bellies out into the sea near where the large rivers deliver their detritus to its waves that the sea islands make their appearance. At this point—namely, at Georgetown entrance—we look in vain for evidences of erosion. The records all point the other way, that is, to a gradual encroachment of the land upon the sea. Thus, in the year 1700, the *Rising Sun*, a large vessel with 346 passengers, that could not cross the Charleston bar, made its way without a pilot to the present site of Georgetown, a thing utterly impossible during the last 100 years. Moreover, a comparison of the soundings on chart No. 428 of United States Coast Survey of 1877, with a chart of the same locality published in Drayton's *View of South Carolina* in 1802, shows that, instead of any scouring out or erosion, there has been a great filling up in the interval. Seaward from Georgetown light-house, Drayton gives depths of from 9 to 30 feet, where Captain Boutelle only found from 6½ to 19 feet of water. Inside the entrance, where the water once was from 30 to 36 feet, the mean level of low tide now only gives a depth of from 9 to 31 feet. Ten soundings taken off South island average now 7½ feet, while ten soundings in the same locality on Drayton's chart average 18 feet.

It would seem then that the sea islands were an outgrowth of the land into the sea, and that this is but a continuation of that long process by which the Tertiary plain itself, reaching inland to the chain of the Appalachians, was formed. The broadest portion of this plain lies under the vestiges of the loftiest of these mountains, whose

denudation has furnished the most abundant material for its formation. Northward, under lesser elevations that could only furnish less material, the plain wedges out and the sea approaches the rocks. The slow uniformity of this process of growth is shown by the gentle and uniform slope with which this plain approaches the sea. Nor does it end abruptly there. For 100 miles or more the sea scarcely exceeds in depth 100 fathoms, and then suddenly deepens to 2,000 fathoms under the Gulf stream. The sea islands are not isolated phenomena, but only the successors to that stage of growth which was in progress in the interior long ago. There an intricate network of swamps and bays corresponds with the present inlets, creeks, and rivers of the coast, representing the old channels and deltas of the rivers when the pine flats and ridges now resting in the meshes of this network were themselves veritable sea islands.

Professor Tuomey refers to Murphy's island, south of S. Santee inlet, as furnishing a typical illustration of the manner in which this occurs. He says:

A bar is formed at the mouth of the river by the action of the ocean. Breakers make their appearance seaward, and gradually push forward the sand as they approach the shore. When the sand rises above the surface the water becomes too shallow to produce breakers; they disappear and commence again off the shore and further south. An eddy is formed between the sand-bar and the shore, in which the river deposits its sediment; from an eddy it is changed, first, into a lagoon, and then into a mud-flat, which increases until the level of high water is reached. It then becomes a marsh and is taken possession of by the marsh reed, to be succeeded when the *débris* collected by their growth has raised the locality above high water, by tufts of rushes. Meanwhile seaward, the sands, first pushed up against the outflowing current of the river by the ocean, are dried by the sun and then blown forward and heaped into hills and ridges, forming a protection against the encroachments of the waters whence they came. Every breeze blowing landward carries along with it particles of fine sand, till they meet with a log or bush or other obstacles, when they begin to accumulate in proportion to the velocity of the wind, sometimes with extraordinary rapidity—piling up and running over the top, rising in ridges and hills to the height of 30 or even of 40 feet. The prevailing winds of this region, the southwest and northeast, are indicated by valleys running in this direction through these hills.

In the manner thus described, the salt water of the ocean being excluded, the surgent island is prepared for the growth of fresh-water plants, such as the cypress and other swamp trees, while pines and palmettos—the advanced guard, as it were, of the vegetable kingdom—establish outposts wherever a few inches of intervening sand renders them safe from immediate contact with sea-water. This theory of the origin and formation of the sea island furnishes explanations of some facts pretty generally observed, as the following: The borders of these islands are usually the highest lands on them, showing their fluvial origin; the prevailing shape of the islands is triangular, the apex always directed to the southwest; the marshes are principally found at the southwest extremities of these triangles; the long slopes are west and south, the short slopes are east and north. This last peculiarity prevails far back into the interior of the country, the bluffs being on the west and south of the streams and the swamps on the north and east.

SURFACE FEATURES.—In approaching the coast from the sea, about the time the white caps of the first breakers are seen, a long low line of smooth, hard, sandy beach, for the most part of a snowy whiteness, makes its appearance. Immediately inland from the beach swell the undulating ridges of drifting sand, ripple-marked by the action of the wind in striking similarity to the wave-marks of water.

Here the palmetto meets you, standing often solitary and alone, a conspicuous landmark in the picture. Beyond rise the dark-green turrets of the pine, beneath which a tangled growth of myrtles and vines is found. Sometimes more than one ridge of sand hills, with an average elevation of 10 or 15 feet, must be traversed before the border of the salt marsh is reached. The salt marshes, their stiff green reeds rising out of the black ooze visible at low tide, and at the flood apparently floating on the water, with here and there a stray palmetto or a group of undersized live-oaks, their limbs covered with the long gray moss, form the scarcely varying frame-work of all landscapes among the sea islands. Everywhere these marshes are penetrated by salt rivers and creeks of greater or less width and depth, and surround islands which vary from a few acres to many square miles in area. These islands attain a height of from 10 to 15 feet—rarely of 25 or 30—above high tide. The mean rise and fall of the tides is 6.9 feet at the mouth of the Savannah river, 6.7 feet at Port Royal, 5.1 feet at Charleston harbor, and 3.5 feet at Georgetown entrance, showing a marked diminution as you advance northeast along the coast. The influence of the tide extends to a distance of 30 miles in a direct line from the sea up the Savannah river and about 15 miles up the Santee. Salt water, however, usually ascends the Santee river only about 2 miles, and even when the current of the river is diminished in seasons of great drought, not more than 4 miles. Up Georgetown bay it reaches farther, and is sometimes injurious to the crops at a distance of 14 miles. What has been said of the Santee is true to nearly the same extent of the Savannah river.

CLIMATE.—Notwithstanding their proximity to the mainland, the sea islands enjoy in a high degree the equable climate peculiar to islands generally. The extremes of temperature are, as might be expected, greatest in the direction of low temperature, and the cold, which is sometimes injurious to the orange and the olive trees, destroys also the germs of many insects inimical to vegetation, as of the cotton caterpillar, and of more importance still, it destroys the germs of disease, as of the yellow fever and of numerous skin diseases that flourish in similar regions elsewhere, preventing them from becoming indigenous and keeping them exotics, forever requiring yearly renewal from without.

The following table presents the leading features of the coast climate, as preserved in the records of meteorological observations made at Charleston, South Carolina:

Abstract of meteorological observations in South Carolina.

[Recorded by Dr. Lionel Chalmers from 1752 to 1759; by John Drayton from 1791 to 1801; in Tuomey's Geological Report of South Carolina from 1816 to 1840; in official returns of Charleston city registrars from 1800 to 1872; in office of United States Signal Service bureau from 1873 to 1880.]

Year.	THERMOMETER.								RAINFALL IN INCHES.					BAROMETER.			FROSTS.		Prevailing wind.	Number of days on which rain fell.		
	Annual mean.	Highest.	Lowest.	Winter mean.	Highest.	Lowest.	Summer mean.	Highest.	Lowest.	Annual total.	Spring.	Summer.	Autumn.	Winter.	Annual mean.	Highest.	Lowest.	Frost, earliest.			Frost, latest.	
1752.....				58	83	18	76	101	40	46.49	1.96	10.70	27.16	6.47								
1753.....				58	82	28	75	91	42	40.93	2.50	18.87	17.41	5.06								
1754.....				60	86	22	75	91	42	37.64	3.50	11.71	13.88	8.55								
1755.....				53	80	27	73	90	40	44.14	7.13	15.92	13.21	7.88								
1756.....				56	84	26	74	96	46	33.76	8.93	8.21	10.07	6.55								
1757.....				57	79	25	76	90	45	40.17	8.47	18.31	11.31	2.61								
1758.....				53	84	20	76	94	35	31.95	2.48	10.92	12.92	5.63								
1759.....				53	81	28	77	93	55	34.51	6.49	8.74	16.15	3.73								
1791.....		90	28																			
1792.....		93	30																			
1793.....		80	30																			
1794.....		91	34																			
1795.....		92	29							71.00												
1796.....		87	17							58.00												
1797.....		85	22							55.00												
1798.....		88	31							48.00												
1799.....										75.00												
1800.....										51.00												
1801.....										42.00												
1816.....	66																			S. W.	70	
1817.....	65																			S. W.	101	
1818.....	64																	Oct. 5		S. W.	77	
1819.....	67																			S. W.	74	
1820.....	67																			S. W.	99	
1823.....		89	19																			
1824.....		91	24																			
1825.....		94	28																			
1827.....		89	16																			
1829.....		100	22																			
1830.....	64	94	20	54			74															
1835.....	63	90	2																		N. E.	34
1842.....										36.5											S. W.	
1843.....										48.6											N. W.	
1844.....										36.00											S. W.	
1845.....				55	84	20	74	96	41	46.5	9.44	10.13	8.40	8.47	30.13	30.52	20.50				S. W.	84
1846.....										36.60												
1866.....				55			77			36.64	6.15	14.16	11.84	4.49		30.350	20.026				E.	68
1867.....				55			73			61.06	11.27	22.31	26.00	7.39		30.704	27.404				S. W.	73
1868.....				54			77			61.22	12.35	10.70	15.84	13.23		30.670	20.530				S. W.	78
1869.....				56			77			43.04	9.37	9.88	9.81	13.07		30.694	23.812				S. W.	66
1870.....				54			78			48.27	11.28	13.49	10.92	12.53		30.668	20.612				S. W.	50
1871.....				58			74			50.88	12.41	7.74	24.23	6.49		30.514	20.614				S. W.	30
1872.....				51			78			43.51	12.13	9.22	14.73	7.43		30.400	20.560				S. W.	49
1873.....	65	95	19	54			79			61.96	9.09	26.20	15.30	11.34	30.083	30.730	20.074	Nov. 21			S. W.	132
1874.....	66	96	20	58			74			62.9	11.9	23.00	10.62	17.4	30.104	30.730	20.110	Nov. 30	Apr. 30		S. W.	113
1875.....	65	96	20	55			75			50.97	10.44	6.11	11.40	13.30	30.095	30.657	27.425	Dec. 10	Apr. 10		S.	138
1876.....	65	97	23	55			79.9			78.4	11.24	31.34	26.91	8.91	30.096	30.659	29.440	Oct. 2	Mar. 22		S. W.	129
1877.....	66	100	36	57			75.8			80.14	26.57	22.73	10.17	11.65	30.096	30.534	20.267	Nov. 11	Mar. 11		S.	150
1878.....	67	97	25	56			77			77.44	17.34	28.20	15.44	16.36	30.057	30.314	20.442	Nov. 27	Feb. 6		S. W.	139
1879.....	67	104	23	51			76			50.60	11.09	15.56	16.34	7.30	30.100	30.609	29.382	Nov. 21	Apr. 5		S. W.	105
1880.....	67	100	13	55			77			46.67	6.56	11.02	19.58	9.53	30.107	30.586	29.562	Nov. 23			S. W.	147
Means.....	65			54			70			50.77	9.96	15.97	15.53	8.99	30.097						S. W.	86
Number years.....	15	23	23	25	9	9	25	9	9	35	24	24	24	24	9	16	16	9	6	25	22	

Notwithstanding the amount of rainfall and proximity to the sea, the climate is not excessively moist. There is a large number of clear days, averaging about 235 during the year, against an average of 86 days in which rain falls, and 44 cloudy and rainless days. Fogs are of very infrequent occurrence. Vegetation is usually checked by cold for not more than six weeks in the year, from the middle of December to the first of February. Nature does not allow the inhabitants of higher latitudes to become purely agricultural in their pursuits, forcing them, during the snows and ice of winter, to seek occupation in other arts and industries. But here she bares her bosom the year round to furnish food and work for man, and seed-time and harvest occur in every month.

HEALTH.—Death and ill-health in South Carolina cannot be attributed to the preponderance of any climatic or local causes, but supervene from such causes as may and must exist everywhere. This negative conclusion may be safely accepted as descriptive of the sanitary condition of the state at large. There has been, however, and not without some foundation, an idea prevalent regarding the unhealthfulness of the coast region, arising from malarial causes, which requires mention, especially as occurrences of recent date have greatly modified it. The sand ridges between the rivers have always been esteemed healthy; the well-kept vital statistics of the city (*a*) of Charleston show that its health record will compare favorably with that of other cities; and numerous localities along the coast, as Mount Pleasant, Sullivan's island, and Beaufort, and many other places, have been much frequented as health resorts during the summer months, even by people from the up-country. It was confidently predicted at the commencement of the late war that no picket line along the coast between the armies could be maintained during the summer and autumn months. To the surprise of nearly every one, however, such did not prove to be the case. Climatic influences interfered in no way with the vigorous prosecution of hostilities, and it was demonstrated that large bodies of white men, under proper hygienic regulations, with the use of quinine as a preventive, might be safely counted on to endure unusual exposure and toil on these shores during the heat of summer. Since the war numerous white families, who formerly removed to the north or to the up-country during summer, have remained upon their farms the year round in the enjoyment of their usual health. By the census enumeration of June, 1880, the death rate among the rural population of the entire sea-island district was 14 per 1,000 for the preceding year. Of the 23 white men who were enumerators of the Tenth Census on the sea islands during the months of June and July, 1880, there was no day lost from work on account of sickness, though many of them were unaccustomed to the exposures which the work necessitated. Doubtless the prophylactic use of quinine has had something to do with the apparently increased healthfulness of this section, but it is also true that the danger to health was formerly greatly overestimated. With thorough drainage and careful attention to the rules of health, and especially to securing pure drinking water, there is no question that fevers might be expelled here as completely as they were from the fens of Cambridgeshire, in England, where they once prevailed but have since yielded to the above methods. During the excessively hot and dry summer of 1723, "yellow fever" made its first appearance in Charleston. At greater or less intervals of time it has since visited the city during the autumn months. After 1748 it did not make its appearance during a period of forty-four years. John Drayton writes in 1801 to the natives and old inhabitants of the city, "it has not yet been injurious." The germs of this disease have never been naturalized on this coast, and require a fresh importation every year. An epidemic occurring in Charleston during the war was clearly traced to a vessel from Havana that had run the blockade, and, as Mr. Drayton describes it, it still remains restricted to certain localities, within a few miles of which perfect immunity from it may be enjoyed. This was clearly shown in the very fatal epidemic imported into Port Royal in 1876, causing a number of deaths there, while no case originated in the town of Beaufort, 4 miles distant, to which place, however, patients suffering from the disease in Port Royal were carried for treatment.

SOILS OF THE COAST REGION.—The soil of the sea island consists, for the greater part, of a fine, sandy loam. This soil rests on a subsoil of yellow sand or yellow clay of fine texture, and deepening in color sometimes to red. These clays give a yellow hue to the otherwise gray surface, which is noticed by Mr. Seabrook as indicating lands peculiarly adapted for the production of the silky fiber of long-staple cotton. Beside these lands there are numerous flats or fresh-water swamps, known as bays. Here and there a few of these have been reclaimed by drainage. The soil is a black vegetable mould of great fertility, resting on fine blue mud and marl. To a very limited extent the salt marsh has also been reclaimed, but as yet agriculture has availed itself so little of the vast possibilities in this line, that the chief value of the salt marsh attaches to its use in furnishing forage and litter for stock, and inexhaustible material for the compost heap. Low as these lands lie they are susceptible of easy drainage. The following analyses will indicate more in detail the character of these soils.

No. 6. *Sandy soil* from the northeast end of James island, taken 12 inches deep, and analyzed for the Census Office. This soil may be considered a specimen of the less sandy soils of the sea islands. Such lands will yield about 300 pounds of long-staple lint one year with another.

No. 12. *Soil* from J. J. Mikell's place on Edisto island, famous for having long and profitably produced the finest grade of sea-island cotton. It may be considered a representative soil, and was analyzed by Professor C. U. Shepard.

No. 13. *Soil of the salt marsh*, air-dried; analyzed by Professor Shepard.

a The official report of the board of health of the city of Charleston for the year 1880 shows 500 deaths for 22,712 of white population, or 22 deaths per 1,000, and 1,121 deaths for 27,287 of colored population, or 41 deaths per 1,000.

Soils of the sea islands and marshes.

	James island soil.	Edisto island soil.	Marsh land.
	No. 6.	No. 12.	No. 13.
Insoluble matter	89.308 } 91.430	92.430 } 92.905	58.110 } 58.438
Soluble silica	2.062 }	0.425 }	0.328 }
Potash	0.131 }	0.200 }	0.190 }
Soda	0.077 }		1.476 }
Lime	0.038 }	0.392 }	0.420 }
Magnesia	0.154 }	Trace.	0.317 }
Brown oxide of manganese	0.077 }		
Peroxide of iron	0.598 }		1.860 }
Alumina	2.845 }	2.490 }	1.131 }
Phosphoric acid	0.200 }	0.095 }	0.062 }
Sulphuric acid	0.154 }	0.070 }	0.422 }
Carbonic acid		0.420 }	0.840 }
Water and organic matter	4.789 }	2.928 }	44.865 }
Total	100.409	100.000	110.021
Hygroscopic moisture	4.120		
absorbed at	25 C. ^o		

By the above analyses, we find an average of more than one-tenth of one per cent. of phosphoric acid, and one-sixth of one per cent. of potash. Allowing a cubic foot of earth to weigh 100 pounds, we would have on an acre to the depth of one foot 4,356,000 pounds, of which one-tenth of one per cent. would be 4,356 pounds, showing nearly 2 long tons of phosphoric acid instead of 15 pounds to the acre. The potash, by the same calculation, would amount to 7,260 pounds, instead of 20 pounds to the acre. Thus, in the place of being barren for lack of these ingredients, each acre of the sea islands possesses an amount of them which, if rendered available to plant growth, would suffice for the production of over 8,680,000 pounds of lint cotton, as they do not, by Jackson's and Shepard's analyses, constitute the one-twentieth per cent. of cotton fiber. Besides, the salt-marsh materials for maintaining and developing the fertility of the soil abound throughout the coast region. There are numerous deposits of post-Pliocene marl on the islands, as at Daton's swamp, on Johnson's island, at Stono creek, at Edisto island, at James Seabrook's island, at Distant island, near Beaufort, and elsewhere. The banks of "Raccoon oyster" shells, peculiar to this latitude, are found in abundance on this coast, and furnish excellent and easily accessible stores of lime. Here, also, in the Stono, Edisto, Coosaw, Bull, Morgan, Johnson's, Beaufort, and Broad rivers, and in other creeks, etc., is found and largely exported as a fertilizer to foreign lands the phosphate rock. Experiments have also demonstrated that the fish, so numerous in these waters, may be caught and used for manure.

PRODUCTIONS.—The olive and the orange tree bring their fruit to full perfection on the South Carolina coast. Once only during a period of sixteen years previous to 1880 were the orange trees injured by frost, at which time the tops of about one-fourth were killed, while the roots put out fresh shoots; the fruit from single trees in the neighborhood of Beaufort has for a series of years sold for \$150 to \$250. Even the banana, with a not expensive winter protection, has been made to ripen its fruits. Two date palms are growing in the open air in Charleston, one of them having a height of 30 feet. Fig trees of every variety, with little or no attention, grow everywhere and produce several abundant crops yearly; so that could some process similar to the Alden process for drying fruit be adapted to them they might become an important staple of export. Every variety of garden produce does well, as witness the extensive truck gardens on Charleston Neck, which furnish distant markets large supplies of fruits and vegetables of the finest quality. The wild grapes, which attracted the notice of the first French colonists in 1562, still abound, and a grape-vine near Sheldon Church, Beaufort county, is 18 inches in diameter. Hay made of Bermuda grass, ranking in the market with the best imported hay, has been profitably grown. Five acres at the Atlantic farm have for a series of years yielded 9,000 pounds per acre yearly; and on the Stono farm two tons one year, and four and a half another, have been made to the acre. Winter vetches grow wild, and the vine of the cow-pea furnishes an abundant forage besides increasing the fertility of the soil. The red rust proof oat, recently introduced, is peculiarly adapted to the mild winters of this region, yielding readily and with great certainty from 30 to 50 bushels per acre. Should an increase of the population call for a larger food supply, the sweet potato would furnish it to an extent practically unlimited. Indigo, rice, hemp, beans, peanuts, the castor-oil bean, the sugar cane, and many other subtropical fruits and vegetables have been successfully cultivated as field crops. Indian corn, of the white flint variety, yields in the coast counties a little more per acre than the average yield of the same crop throughout the state. Nevertheless, only a very limited attention is bestowed on the culture of any of these articles, the leading crop being long staple cotton to the exclusion or dwarfing of all others.

VARIATIONS OF COTTON.—In a handful of ordinary cottonseed three varieties may often be recognized, presenting well marked differences. The largest of these is covered with a green down; another smaller and much more numerous seed is covered with a white or grayish down; the third variety is naked, smooth, and black. It may

not be possible to say whether these three sorts of seed correspond to three classes under which the numerous varieties of cotton are arranged, that is, 1st, the *green seed*, with the *Gossium hirsutum*, or shrub cotton, attaining a height of from 10 to 12 feet, a native of Mexico, and varying as an annual, biennial, or perennial, according to the climate in which it is grown; 2d, the *white seed*, with the *Gossypium herbaceum*, or herbaceous cotton, an annual, attaining a height of 2 feet, native of the Coromandel coast and the Nilgeherries; 3d, the *black seed*, with *Gossypium arboreum*, or tree cotton, a native of the Indian peninsula, but attaining a height of 100 feet on the Guinea coast, and producing a silky cotton. The black seed, however, is not distinguishable from the seed of the long staple or sea-island cotton. If selected from among the other varieties of upland cottonseed, it will in a series of years produce a finer, silkier, and stronger fiber than ordinary uplands.

If the best and purest sea-island cottonseed be planted in the neighborhood of the upland or short staple cotton, they will readily hybridize. Among the numerous varieties of hybrids thus produced there will prominently appear a vigorous plant with very large green seed. The staple of these green-seed plants varies greatly, in some instances being very short and coarse, in others longer and finer even than the best sea-island. The most marked characteristics, however, of these hybrids, will be the size and vigor of the plants, the size of the seed, and the very small amount of lint they yield. A noticeable feature, too, is the large number of vigorous growing but unfruitful plants that these green-seed hybrids produce, their large, glossy leaves rising above the other plants, but bearing neither bud nor blossom through the season. Possibly such plants merely resume the biennial character of the tree or shrub cotton, and would be fruitful the second season.

History of long-staple cotton.—It would be a matter of much interest to determine the origin and history of the varieties of cotton now in cultivation. The difficulties of doing this are much increased by the very wide geographical range occupied by the plant. The earliest explorers, Columbus, Magellan, Drake, Captain Cook, and others, seem to have found it almost everywhere in the broad belt extending from the equator to 30° south and to 40° and 45° north latitude, where it now grows. Although it is not found among those oldest of vestments, the wrappings of Egyptian mummies, its use was known to man in Europe, Asia, Africa, America, and the outlying islands of the sea, in the remote past, far beyond the historic age. Its very name itself bears evidence to this, occurring as it does in many and in the most ancient languages.

Nevertheless nothing can show more clearly the importance of tracing and understanding the history of plants under cultivation than the variation and improvements in black seed-cotton since its introduction on the Carolina coast. It is known that the first bale of long-staple cotton, exported from America in 1788, was grown on Saint Simon's island, Georgia, by a Mr. Bissell, from seed that came from either the Bahama or the Barbadoes islands. Singularly enough the authorities leave this matter in doubt, the Hon. William Elliott saying it came from Anguilla, one of the Bahamas, and Signor Filippo Partatori (Florence, 1866) saying it came from Cat island, one of the Barbadoes. But as Anguilla is one of the Barbadoes and Cat island one of the Bahamas, it would seem difficult to decide to which group of islands we are indebted for these seed. However, as Mr. Thomas Spalding, of Sapelo island, says, in a letter to Governor Seabrook in 1844, that three parcels of long-staple cottonseed were, to his knowledge, brought in 1785-'86 from the Bahamas to a gentleman in Georgia, it would seem certain that the seed reached our coast from those islands. There it was known as *Gossypium barbadense*, as coming from the Barbadoes. In the Barbadoes it was called Persian cotton, the seed having been brought from that country. In this manner its descent from the *G. arboreum* of India is traced.

Be this as it may, Mrs. Kinsey Burden, Burden Island, Colleton county, South Carolina, obtained some of these seeds from Georgia and planted them. This crop failed to mature, and the first successful crop of long-staple cotton grown in South Carolina was planted in 1790, by William Elliott, on the northwest corner of Hilton Head, on the exact spot where Jean Ribault landed the first colonists and erected a column of stone, claiming the territory for France a century before the English settled on the coast. Mr. Elliott's crop sold for 10½¢. per pound. Other planters made use of this seed, but it was not until Kinsey Burden, sr., of Colleton county, began his selections of seed, about the year 1805, that attention was strongly called to the long staple. Mr. Burden sold his crop of that year for 25 cents per pound more than did any of his neighbors. He continued to make selections of seed and to improve his staple, and in 1825 he sold a crop of sixty bales at \$1.16 per pound. The year subsequent his crop sold for \$1.25, and in 1828 he sold two bales of extra fine cotton at \$2 per pound, a price not often exceeded since. The legislature was on the point of offering Mr. Burden \$200,000 for his method of improving the staple of cotton, and Mr. William Seabrook, of Edisto, was prepared to pay him \$50,000 for his secret, when it was discovered that the fine cotton was due wholly to improvements made in the seed by careful and skillful selections. Since then the greatest care has been bestowed upon the selection of the seed, and to such perfection was the staple brought by this means that the crops of some planters were sold, not by sample, but by the brand on the bale, as are the finest wines.

During the war, the cultivation of the finest varieties being abandoned on the islands, the seed removed to the interior greatly deteriorated in quality. So scarce, on this account, was good seed directly after the war, that J. T. Dill, a cotton merchant in Charleston, at one time had, in an ordinary letter envelope, the seed from which all the better qualities of long staple now cultivated is derived. Nor have the improvements made by careful selection of the seed ceased in later years. The staple has kept fully up to the best grades of former days, and

the proportion of lint to seed-cotton has been increased. Formerly one pound of lint cotton from five pounds of seed-cotton of the fine varieties was considered satisfactory. Thanks to the efforts of Mr. E. M. Clark, a cotton has been recently found which yields one pound of lint to three and a half of seed-cotton, preserving at the same time the length, strength, and evenness of fiber characteristic of the best varieties.

Appearance of the plant.—The sea-island cotton-plant is a larger and more vigorous grower than the upland plant. It withstands the vicissitudes of heat and cold better, and it is less subject to disease; blight and rust do not affect it as readily as they do the upland, nor does it shed its "forms" and bolls to anything like the same extent as the short-staple cotton does. These remarks as to rust apply also to those varieties of uplands in which the length of the staple has been improved by selection of the seed, and rows of this are often seen healthy and vigorous, while the short-staple uplands around are withered with the rust. The early growth of the sea-island plant is so vigorous that it maintains itself in fields infested with Bermuda and nut grass, as the uplands cotton could not do. The leaves are larger, smoother, and of a brighter green than those of the uplands varieties, and the flowers are larger, handsomer, and of a more golden yellow. But the bolls are smaller, and, instead of being five-lobed, are only three-lobed—these lobes being so sharp-pointed as to prick the fingers to the serious inconvenience of pickers not accustomed to gather it. Of course, the small size of the bolls, requiring so many to make a pound, adds much to the tediousness and expense of harvesting the crop. The fiber of the lint is much finer, stronger, smoother, and silkier than the uplands cotton; and while the latter is only one-half to three-fourths of an inch in length, the sea island will measure $1\frac{1}{2}$ to $2\frac{1}{2}$ inches. The color, too, has a cast of creamy yellowness not observed in uplands cotton.

STATISTICS.—The population of the coast region, excluding the city of Charleston, is 67,132. Of this number 83 per cent. are colored. This percentage was 90 according to the census of 1870. The decrease of 7 per cent. results in part from an influx of whites, in part from the removal of negroes—as will be shown further on—to the upper country, and in part also to the more rapid natural increase of the more thrifty and vigorous race. This gives a population of 39 to the square mile against an average for the whole state of 33. Although this population is almost exclusively agricultural, the amount of land tilled per capita is only $1\frac{1}{2}$ acres against an average for the whole state of 3.8 acres per capita. There are only 62 acres of improved land per square mile, while for the whole state the average is 135 acres to the square mile. There is no deficit of work stock, there being one work animal to every 13 acres of tilled land, while the average for the state is only one to 24 acres of tilled land. Nor is there any lack of small farms, the coast farms averaging 18 acres of tilled land, while the state averages 40 acres to the farm.

The amount of grain produced per capita, including rice, is 11 bushels, scarcely the yearly rations for a man, and the minimum produced in any region of the state; and this, too, while the product of grain per acre—as has been said—is above the average product of the state. The product of lint cotton per capita is 42 pounds, the whole state averaging 249 pounds. The yield of lint cotton per acre cultivated in cotton is 92 pounds, about half the average of the state, which is 181 pounds. The live stock is 1 to $1\frac{1}{2}$ of the population, being about half the average of the state, which is $1\frac{1}{4}$ of live stock to 1 of population.

From these data it appears that, in this more closely populated section, with lands of easy tillage, that yield, as will be shown by what follows, as great or greater a remuneration to agriculture as elsewhere in the state, with more than its proportion of work stock, and a greater average of small land-holdings, the amount of land improved is less than elsewhere, and the actual production—whether among crops like cotton, or a subsistence crop like grain, or the live stock, that indispensable adjunct to successful agriculture, be considered—falls far below the general average of the state. Statistics may not decide whether this be due to that indolence which sometimes results from the ease with which human beings subsist in regions of such tropical abundance, or to the overwhelming preponderance of the negro race, or to the minute subdivisions of the farms. The following table will present the data in regard to the last-mentioned cause:

Table showing graphically the relation of the size of farms and number of work stock to cotton production.

Locality.	Average number of acres of tilled land to each farm.	Acres in cotton to each bale produced.	Work stock to the acres of tilled land.
James Island	81	1.4	1 to 80
Christ Church	72	2.4	1 to 30
Edisto	16	2.6	1 to 18
Wadmalaw	18	3	1 to 44
John's island	15	3.2	1 to 17
Beaufort	13	4.2	1 to 18

THE LOWER PINE BELT, OR SAVANNA REGION.

Contiguous to and immediately inland from the coast region lies the lower pine belt or savanna region of South Carolina. This section includes the southern and eastern part of Hampton county, nearly all of Colleton, two townships in Orangeburgh, all but the northwest corner of Clarendon, the southwest portion of Marion, the whole of Williamsburgh, and all Charleston, Georgetown, and Horry counties not lying on the coast, and comprises nearly one-fourth of the entire state.

SURFACE FEATURES.—The surface features of the lower pine belt bear a striking analogy to those of the coast region. The uplands, the so-called "pine barrens", represent the sea islands. Numerous large fresh-water rivers replace the great salt-water inlets and arms of the sea along the coast, and the interminable network of extensive swamps and bays recall the salt marshes of the coast. Eight large rivers, receiving all the water that falls in South Carolina and a large proportion from the water-shed of North Carolina, besides several smaller rivers and innumerable lesser streams, traverse this region, and furnish more than 1,000 miles of navigable waters. The general appearance of the country is low and flat. The uniform level of the surface is scarcely broken anywhere, except here and there on the banks of the streams by the occurrence of slightly rolling lands. Its maximum elevation above tide-water, 134 feet, is reached at the village of Branchville, on the South Carolina railroad. From the data furnished by the surveys of the railroads traversing this region,^(a) the Port Royal, South Carolina, and Wilmington roads, it appears that the average slope is about $3\frac{1}{2}$ feet per mile. This slope, however, seems to be much more rapid in the western and narrower part than it is in the eastern and broader portion of the belt. Altman, on the Port Royal railroad, is 105 feet above mean high tide at the head of Broad river, 18 miles distant in a direct line, giving a fall of 5.8 feet per mile. Branchville is 134 feet above the sea, which, at North Edisto inlet near Jehossee island, is 48 miles distant, making the fall 2.8 feet per mile. In the east the railroad bridge of the Great Pedee is 52 miles from the sea, and has an elevation above it of only about 59 feet, or but little more than one foot to the mile. This fall would, with skillful engineering, be sufficient for thorough drainage as well as for irrigation. Left as it is, however, wholly to the operations of nature, this desirable object is far from being accomplished, and the broad but slow currents of the tortuous streams never free the swamps and lowlands of their superfluous water. In connection with drainage and the embankment of the rivers, the assertion is frequently made, that such works are less practicable now than formerly, in consequence of the increased size and frequency of freshets, resulting from clearing the forests, the chief obstructions to the rapid passage of rainwater into the streams. In the absence of records giving exact data on this point, this assertion rests on the apparent nature of the case rather than on ascertained facts. On the contrary, nothing can be more certain than that no subsequent freshet has attained the height and extent of the great flood of 1796, known as the Yazoo freshet.

TIMBER GROWTH.—The characteristic timber growth of the uplands is the long-leaf pine, extending in open pine woods over the wide plain, with scarcely any undergrowth except here and there the scrub oak and grasses of the genus *Aristida* and *Sporobolus*, the wire and drop-seed grass. The palmetto reaches only a few miles inland from salt water, but the live-oak is found as much as 60 miles from the shore-line. The magnolia, tulip tree, sweet and black gum, white and red bays, white oak, black walnut, elm, hickory, and cypress are among the largest and most conspicuous trees of the swamps, the dense undergrowth commencing with a fringe of gall-berry (*Prinos glaber*) on the margin of the swamps, and consisting of a great variety of grape, brier, and other vines, myrtles, etc.

CLIMATE.—In the absence of weather records, it is difficult to express the difference between the climate of the lower pine belt and that of the sea-coast, already described, more definitely than to say that it is such difference as is to be found between the conditions favorable for the growth of the cabbage palmetto which barely touches the southern border of the belt, and of the live-oak that just extends to its northern or inland margin. A low, flat country intersected by numerous swamps might naturally be thought very sickly. This region, however, has one advantage: almost everywhere there are found small tracts, islands as it were, of dry, sandy soil, heavily timbered with the long-leaf pine, which is a barrier to the invasion of malaria. These retreats furnish places of residence as healthy as are to be found anywhere; such a place is the village of Summerville, on the South Carolina railroad, a health resort that divides with Sullivan's island the patronage of the citizens of Charleston during the warm weather. McPhersonville, in Hampton, and Pineville, in Georgetown county, are villages of the same character, and there is scarcely a neighborhood that has not some such healthy spot as a place of residence during summer. The dread of malaria is much less than it was, when the opinion that the colored race was exempt from such influences was adduced as an argument to show the providential nature of their location here, to develop these fertile lands. The reverses of fortune, sustained as a result of the war, have forced many white families to reside the summer long where it was once thought fatal to do so, and the experiment has been successful, thus exploding the extravagant idea that white people could not enjoy health here during the summer months. Replies from twenty-three townships state, without exception, that the inhabitants enjoy good health, and that a considerable proportion of the field work is performed by whites, a great change since the war. The census returns give 15 deaths per 1,000 population in the portions of Charleston and Colleton counties lying in this region, for the year 1880.

^a The Charleston and Savannah road runs near to and parallel with the coast, and the surveys of the Northeastern road have been destroyed.

SOILS.—The 7,000 square miles of uplands in the lower pine belt comprise three leading varieties of soil: 1st. A sandy loam with a white sandy subsoil. 2d. A sandy loam with a yellow subsoil. 3d. A sandy loam with a clay subsoil; the latter is generally yellow, but sometimes it is red. The surface soil is lighter or darker, in proportion to the varying quantities of vegetable matter it contains, and where the clay subsoil approaches to the surface it assumes, on cultivation, a mulatto color. These soils bear a strong resemblance to the sea-island soil, with the advantage that they are very generally underlaid by easily accessible beds of marl richer in lime than those of sea islands. In drainage, however, they compare unfavorably with the sea islands. For the scouring effect of the rise and fall of the tide which keeps the water-ways around the islands open is not only not experienced in this belt, but, on the contrary, the luxuriant water growth that flourishes here has filled up the channels, converting them into swamps through which scarcely any current passes. This, in connection with the level character of the country renders the body of these lands wet. But for this, the good mechanical constitution of the soil, being light and easily tilled and at the same time (except in the case of white sandy subsoil) sufficiently compact to be retentive of manures and moisture, together with the abundance of marl, and of peat and muck at hand as improvers of the virgin soil, would have made them most desirable lands for tillage. As it is, not more than 1 acre in 22 is under cultivation, and the prices of lands are from \$5 down to 50 cents per acre.

The following partial analyses from Tuomey's report give an idea of the constitution of some of the poorer soils of this region, classed as pine barren. Localities are not given. 1. Close, sandy soil. 2. Dark gray soil. 3. Very light sandy soil. 4. Close yellow sandy soil:

	1	2	3	4
	Per cent.	Per cent.	Per cent.	Per cent.
Silica	92.57	91.64	94.00	93.00
Alumina.....	1.70	1.70	0.94	0.81
Peroxide of iron, with a feeble trace of carbonate and phosphate of lime ..	0.70	0.50	0.50	1.20
Water of absorption and organic matter.....	5.03	6.16	4.56	4.99
Total	100.00	100.00	100.00	100.00

Dr. J. L. Smith furnishes, in the report cited, the following partial mechanical analyses of cotton lands in this section, near the headwaters of Cooper river:

Pine barren lands.

	SOMERSET.		PINROPOLIS.	OPHIR.		CHAPEL HILL.	
	Soil.	Subsoil.	Soil.	Soil.	Subsoil.	Soil.	Subsoil.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Sand.....	76.0	80.0	90.0	80.0	85.0	93.0	70.0
Clay.....	14.0	15.5	6.2	10.6	12.2	27.0	25.2
Moisture.....	3.0	2.5	0.8	1.2	1.3	2.0	1.8
Vegetable matter.....	7.0	2.0	3.0	2.2	1.5	3.0	3.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Swamp lands.—The 4,500 square miles of overflowed lands in the savanna region presents quite a variety of swamp lands. The most elevated of these are cypress ponds, being shallow flats with an impervious clay bottom, thickly grown in small cypress; some of them contain a thick deposit of vegetable matter, and when drained have proved very productive. Next in order come the almost impenetrable "bays", thickly set with a growth of bay, gum, and tulip trees, and a dense undergrowth of vines and bushes. The soil is peat or muck, resting on blue mud and underlaid by marl and sand. Then come the open savannas and the river bottoms, a rich, tough, loamy soil, having at times a depth of 60 feet, derived from the denudation of the upper country, whose "richest possessions are found in well sifted purity in these vast swamps". These are the rice lands of Carolina. Taken all in all, whether we consider the physical character of the soil, the amount of organic matter it contains, or the subtropical climate of the locality, with the facilities for irrigation, either for culture or to renew the surface fertility, they are, perhaps, excelled in productiveness by few lands in the world.

PRODUCTIONS.—The staple productions of the lower pine belt are rice and cotton. Of these two, the most characteristic, if not the most important, is the rice crop, which will therefore be first considered.

Rice culture.—The methods of rice culture fall under two heads, viz, the dry and the wet.

The dry culture is pursued on uplands and on low grounds not susceptible of irrigation. Rice is cultivated very much like cotton, planted in drills from 2½ to 3½ feet, and in hills from 18 to 24 inches apart, from 20 to 30 seed being dropped in the hills. The ground is afterwards kept clean and stirred by the use of the plow and hoe, with one hand picking off the grass in the hills, when the rice is about 6 inches high. The yield varies with the soil and culture from 15 to 50 bushels to the acre. This rice sometimes commands a fancy price, as seed-rice, being free from the seed of the red rice that springs up as a volunteer in the fields under water culture.

The water culture of rice is conducted on three sorts of low grounds: 1st. Flats which may be irrigated from ponds or water "reserves" lying at high level. 2d. River swamps into which water may be conducted by canals running from the river above, and returned to it again at a lower level; such lands may be found anywhere in the state. 3d. The tide-water lands, which are only found near the coast. These lands lie in such a position on the lower course of the rivers, that while they are subject to a sufficient "pitch of the tide" to irrigate them on the flood and to drain them on the ebb, they are free from the invasion of salt-water below and from the freshets that occur higher up on the streams. By taking in the fresh water from the rivers above and letting it out below at low tide, these lands have been reclaimed as low down as the salt marshes. They are of limited area and of inexhaustible fertility, the waste of cultivation being constantly restored by the rich deposits from the turbid streams that irrigate them. Formerly their value was estimated in hundreds of dollars per acre. Since the war the difficulty of obtaining labor has changed this, many of the finest plantations remain uncultivated, or only partially cultivated, and lands once worth from \$200 to \$300 per acre may now be bought at from \$20 to \$30, or less. There are more than 2,000,000 of acres of land consisting of inland and river swamps and of fresh water and of salt marshes, admirably adapted to rice culture, now lying unused in this section of the state, most of it in its original wilderness.

There are numerous methods employed in the water culture of rice, from that known as dry culture, when water is sparingly used, to that known as the "all-water culture", where the crop is only dried once or twice during the season for the purpose of weeding it. Usually it is "flowed" four times, the floodings being severally known as the "sprout flow", to perfect the germination; the "point flow", to stretch up the young plant; the "long flow", when the plant is six to eight inches high, after the first and second hoeings; and the "lay-by flow", after the third hoeing and until harvest. The fine mud and decomposed vegetable matter composing these soils is so soft that a horse will readily bog in it, and therefore horse-power has been little used in their cultivation; an objection that, with the solid cross-dams at short distances, would not apply to the plow moved by steam-power. Horse-power has, however, been used so far as to show that seed-drills for planting and the mowing machine for harvesting may be successfully employed in rice culture. Under these circumstances, taking into consideration the amount and certainty of the yield (from 40 to 80 bushels per acre), and the improved machinery for thrashing and hulling, there is perhaps no food crop so entirely under the control of mechanical inventions, and so little subject either to the vicissitudes of season or the uncertainties of human labor as the rice crop. The stem is much superior as forage to that of any of the small grain, and, except the hulls of the grain, there is no waste in the crop; the very dust from the pounding, known as rice flour, being most nutritious food for stock.

Although 80 bushels per acre is generally given as a large field crop, the possibilities of the product are much greater. The rice crop for the whole state averages 20 bushels to the acre. This means 600 pounds of merchantable rice worth, say, \$30; 400 pounds of straw, worth \$2.80; and 100 pounds of flour, \$1.50; in all, \$35.30. Cotton gives an average of 181 pounds per acre, which, at 10 cents, would be only \$18.10, or a little over half the gross yield of rice. Why is it, then, that rice culture is in so depressed a condition, and cotton culture so flourishing? In answer to this question, the reason may be briefly stated to be that condition of industry which favors small enterprises and discourages the cumulation of capital in large investments and the organization of labor into large masses, which the embankment, drainage, and irrigation of a rice-field requires.

The allurements of the ready money realized by collecting the products of the forest, and by rice and by cotton culture, has diverted attention from other crops in this section. The culture of corn as a market crop would be profitable; the red rust-proof oat is admirably adapted to this climate, and is one of the most certain crops, yielding readily from 30 to 50 bushels to the acre. Although New England and even European hay has for many years been purchased to subsist, in part, the work stock in this section, Mr. Ruffin, who came from the clover-fields of Virginia, says in his official report on the agriculture of the lower and middle parts of South Carolina: "Few countries possess greater natural facilities, or which are more improvable by industry, for producing in abundance grasses, hay, and live stock and their products of meat, butter, and milk, all of which are now so deplorably deficient."

STATISTICS.—The lower pine belt contains about 7,210 square miles, of which 4,500 are alluvial or swamp lands, either covered with water or subject to overflow. The tilled land is 358,533 acres, by the census returns of 1880, which is 30 per cent., or 171,306 acres less than the number given by the census of 1870. There are 1.6 farms and 49 acres of tilled land per square mile, or 20 acres of tilled and 400 acres of untilled land to the farm. Something less than 1 per cent. of the total area, or 6.4 acres per square mile, is planted in cotton; there is in grain of all kinds 15.8 acres, and in other crops and fallow 13 acres per square mile, with 1.8 head of work stock and 23 head of all live stock. These figures represent the minimum (the area in other crops and fallow alone excepted) to be found anywhere in the state. Notwithstanding the small proportion of stock to area, the people here are the staunchest adherents of the fence law, and claim entire freedom of range for their cattle. This, too, while the number of stock of all sorts is only 1.15 per capita, being less than in any part of the state, except upon the coast.

The population numbers 203,748 (including 49,999 in the city of Charleston), or 28 per square mile, which is less than in any part of the state, the sand hills excepted, where the number is 11.7. The ratio of colored to white is greater than elsewhere except upon the coast, and is 69 per cent., the same that it was given at in 1870.

The tilled land is 1.7 acres per capita; 0.2 acres more than on the coast. This is not quite one-half the average for the whole state, and is owing, 1st, to the large area of unreclaimed swamps; 2d, to the number of the population engaged in the turpentine and lumber business. The large bodies of land held solely for the forest products they yield, as turpentine, lumber, shingles, staves, etc., accounts for the fact that while the number of farms to the square mile is few, the number in proportion to the population is as great, even as among the small farms on the coast, being 1 to every 12½ of the population. Nevertheless the amount of land tilled per capita has decreased 38 per cent. since 1870, showing that the forest industries are gaining on agriculture.

Although the lower pine belt comprises nearly one-fourth of the state, it produces only a fraction over 5 per cent. of the cotton crop. The percentage of the total area planted in cotton is less than one-tenth of one per cent. in the southeastern third of Charleston, in the whole of Georgetown, and in the greater portion of Horry county. From one-tenth to one per cent. of the area is planted in cotton in the lower half of Hampton, in Colleton, in the northeastern portion of Charleston, in the southern third of Williamsburgh, and in portions of Horry county. From 1 to 5 per cent. of the area is planted in cotton in the northeastern corner of Colleton, in the northeastern part of Charleston, in the upper two-thirds of Williamsburgh, in the lower one-fourth of Marion, and in Clarendon county.

In point of production we have 2.7 bales of cotton per square mile against 1.9 in 1870, an increase of 42 per cent., but still less than half the minimum produced elsewhere except on the coast. Per capita the yield is only 68 pounds of lint, but per acre planted in cotton it is 171 pounds, showing that in this little cultivated region the yield of the land planted is but little below the average of the state. So, too, of the grain crop, while it was only 7 bushels in 1870, and in 1880 only 11 bushels per capita, and only 236 bushels to the square mile, it averages over 15 bushels to every acre planted, which is nearly 50 per cent. above the average of the state. The increase in the amount of grain produced has been 82 per cent. on the crop of 1870. The work stock during the same period has increased 50 per cent., and the live stock 76 per cent.

The explanation of these seemingly paradoxical facts is that this fertile but thinly-peopled region is scarcely reclaimed at all from the dominion of the waters for man's uses; there being neither capital nor organized labor commensurate with this undertaking, what of either of these forces is to be found employs itself in cultivating the poorer but more easily tilled land, or in the more tempting occupation still of gathering the products of the forest, which nature with lavish hand offers in abundance.

THE UPPER PINE BELT.

The upper pine belt of South Carolina is sometimes called the "middle country", as distinguished from the "upper country" and the "low country", between which it lies. It has also been known as the central cotton region of Carolina, having formerly led, as it still does in some respects, in the culture of that staple. It may be defined as that portion of the state lying at an elevation above the sea of between 130 and 250 feet. It crosses the state in a northeast direction, from the Savannah river to the North Carolina line. To the south it is bounded by the lower pine belt, where the flat open pine woods, with an undergrowth of coarse grasses, gradually give place to higher and more rolling pine lands, with an undergrowth of oak and hickory. To the north the upper pine belt sweeps round the base of the interrupted range of high red hills which traverse the state, or rises, in the intervals of this range, into the still more elevated sand hills. It comprises generally the counties of Barnwell, Orangeburgh, Sumter, Darlington, Marlborough, and Marion, the northern half of Hampton, and the northwest corner of Colleton. Along the rivers it penetrates northward beyond the limits of the counties named. As uplands on the first level above the swamps it extends, in Aiken county, as high up the Savannah as Old Fort Moore, at Sand Bar ferry; in Richland it reaches along the Congaree nearly to Columbia, embracing the wide level area of Lower township, lying between that river and the sand hills; along the Wateree, between the swamps and the high hills of Santee, it passes into Kershaw county, and along the Great Pedee it passes up among the sand hills of Chesterfield.

SURFACE FEATURES.—The land is level without being flat, and is sufficiently rolling to insure good drainage for the most part. While the general slope follows the southeasterly course of the rivers, the land rises more rapidly in the west, which gives the region a marked easterly slope in addition to its southeastern inclination. Thus, in the west, Appleton, on the Port Royal railroad, 46 miles distant from tide-water, has an elevation of 259 feet, while Orangeburgh, on the South Carolina railroad, 65 miles from tide-water, has only the same elevation, and Wedgefield, on the Manchester and Wilmington road, 75 miles from tide-water, has an elevation of only 236 feet, these being the highest points on the respective roads.

The water courses rising in this region, or in the sand hill region above, are clear and rapid, while the larger rivers passing through it, that come from the mountains, are turbid. The latter furnish this region with valuable facilities for the transportation of produce. On the western side, the Savannah is navigable to Augusta for steamboats of from 200 to 300 tons burden. The Salkehatchie river, rising in Barnwell county, might be rendered navigable to the county-seat by removing logs. The two Edistos might be rendered navigable for small steamboats, and if the contemplated canal connecting those streams with Ashley river were opened it would become an

important avenue for the cheap transportation of produce. Steamboats carrying from 800 to 1,000 bales of cotton have passed up the Santee and its confluent, the Congaree and Wateree, as far as Granby (2 miles below Columbia), and to Camden. In the east the Great Pedee is navigated by steamers to Cheraw, 120 miles in an air line from the sea; for smaller craft Lynches river (the Kaddipah) and Black creek were navigable, the one 80 and the other 30 miles from where they join the Great Pedee. The Little Pedee is also navigable for vessels of considerable burden. Beside the large streams mentioned there are numerous smaller ones in this region, flowing with a rapid current through healthy localities heavily timbered with pine, and capable of furnishing water-powers sufficient for the largest factories. On the ridge between the North and South Edisto, in Orangeburgh county, springs of fine drinking water furnish a water-power, sufficient for grinding and ginning, a few hundred feet from the spot whence they issue from the earth. There are numerous small lakes, chiefly in the swamps, but sometimes on the uplands; in Barnwell there is one, a beautiful sheet of clear water, 2 miles in circumference, with a beach-like shore affording a fine drive, and surrounded on all sides by high and healthy pine uplands.

Wells.—Shallow "sweep" wells (the bucket being attached to a pole fastened to a long lever balanced near its middle) are characteristic of this region; generally they are from 10 to 20 feet in depth, with only a short wooden curb on top, for the rest uncurbed, being dug through a fine compact yellow or red clay to a stratum of quicksand, in which an abundant supply of pure and cool water is found.

TIMBER GROWTH.—The region is covered with a rather sparse growth of large long-leaf or yellow pine, with an undergrowth of oaks and hickories. Among the eight or ten species of oaks, the live oak does not appear, except as a planted tree; the water oak, however, attains perfection, covering with its evergreen foliage, not unfrequently, an area of half an acre, and measuring from 8 to 10 feet through at the root. Of the upland oaks, I mention the forked-leaf black-jack, indicative here of a dry and thirsty soil; and the round-leaf black-jack, showing a moister and more fruitful soil. Dogwood is also common. Here is the northern limit of the magnolia in its wild state, and of the gray moss (*Tillandsia*). The swamp woods are cypress, white oak, gum, ash, hickory, beach, elm, and black walnut.

The early settlers in this region were stock raisers, and kept up the Indian practice of burning off the woods during the winter. The destruction of the undergrowth by this means favored the growth of grasses, and numerous herds of almost wild cattle and horses found abundant pasturage chiefly upon what was known as the wild oat, and the wild pea-vine. The cattle were sometimes slaughtered for their hide and tallow. The names of many townships and neighborhoods still testify to this primitive industry, as Steer Pen, Steerpoint, Horse Pen, and Pen Corner. The uplands were covered, as they still are, with a large growth of yellow pine, and a deer might have been seen in the vistas, made by their smooth stems, a distance of half a mile; where now, since the discontinuance of the spring and autumn fires, it could not be seen 15 paces, because of the thick growth of oak and hickory that has taken the land.

CLIMATE.—The upper pine belt is a peculiarly healthy region, and throughout its extent a remarkable number of instances of unusual longevity are reported. There are no prevailing diseases, unless it be a mild type of malarial fever, during autumn, along the river swamps. The upland swamps not being subject to overflow, and resting on sand, are not troubled with these complaints. The seasons most favorable for cotton are those in which there is a dry, cold winter to facilitate the preparation of the land; light showers in April to insure germination; a dry and warm May and June, not only to render the destruction of the grass easy, but, as the cotton planters term it, to "cook the cotton-plant", hot weather, and even drought at this stage of growth, increasing its productiveness; in July and August hot and seasonable showers to keep up the strength of the plant and promote fructification; and a dry fall for picking. The length of time between the latest frost in the spring and the earliest frost in autumn has an important bearing on the crop.

Although the planting of cotton during these years was sometimes completed as early as the 30th of March, irreparable injury to the stand was only inflicted once, in 1849, when snow fell on the 15th of April, and was succeeded by cold weather. Nor do the autumn frosts always destroy the plant completely; blossoms at Christmas and New Year are not unfrequently seen, and there are occasionally winters of such mildness that the old cotton roots throw out fresh shoots in the spring; and there are rare instances where fields lying out have thus borne a crop the second year that was worth gathering.

SOILS.—The upper pine belt contains something over 6,000 square miles, about one-sixth of which is swamp and the remainder uplands. The uplands consist of a fine, light gray, sandy loam, resting on a subsoil of red or yellow clay. In the east, in Marlborough and Marion, the clay is usually found at only from 3 to 4 inches. In the west it is often deeper, and a subsoil of yellow or red sand intervenes between it and the surface soil; even here the depth to clay is seldom as much as 2 feet.

The following are the analyses of these soils, made for the Tenth Census:

No. 3. *Sandy soil*, cultivated; field of C. S. McCall, near Bennettsville, Marlborough county; taken 12 inches; original growth, long-leaf pine, with undergrowth of oak and dogwood; has been planted for two or three generations; yield for several years past, one bale of cotton per acre.

No. 7. *Sandy mulatto soil*, cultivated; taken from Governor Hagood's plantation near Barnwell Court House; original growth, long-leaf pine, with oak and hickory undergrowth; yield, 764 pounds seed-cotton, average for ten years on 140 acres.

No. 8. *Sandy soil*, cultivated, taken near the Savannah river, from the Johnson field on the Cathwood plantation of P. F. Hammond, in Aiken county, the soil being taken uniformly to the depth of 12 inches. The original growth was long-leaf pine, with an undergrowth of post oak and black-jack runners. The land was cleared in 1835, and has been planted continuously in cotton for the last thirteen years, yielding an average of from 1,000 to 1,200 pounds seed-cotton on 200 acres, the cotton being a long-staple variety of uplands, selling for 2 to 5 cents per pound above ordinary uplands, and not very prolific.

No. 9. *Virgin forest soil* from red clay ridge near Marion and Marlborough line, on the Donohoe plantation of W. D. Johnson; growth, large hickory, oak, and pine; similar land under present culture averages, for large fields, a bale of cotton to the acre one year with another, when planted for a succession of years in the same crop.

Soils of the upper pine belt.

	CULTIVATED SOILS.			VIRGIN SOIL.
	Marlborough county.	Barnwell county.	Aiken county.	Marion county.
	No. 3.	No. 7.	No. 8.	No. 9.
Insoluble matter.....	96.000 } 96.950	91.280 } 93.710	93.695 } 95.178	84.754 } 89.189
Soluble silica.....	0.950 }	2.489 }	1.488 }	4.435 }
Potash.....	0.040	0.092	0.076	0.192
Soda.....	0.027	0.047	0.060	0.069
Lime.....	0.052	0.091	0.114	0.068
Magnesia.....	0.060	0.046	0.202	0.204
Brown oxide of manganese.....	0.023	0.105	0.020	0.036
Peroxide of iron.....	0.504	0.760	0.737	1.097
Alumina.....	0.441	2.430	1.846	4.854
Phosphoric acid.....	0.064	0.159	0.036	0.022
Sulphuric acid.....	0.003	0.160	0.106	0.236
Water and organic matter.....	1.561	3.091	1.771	3.312
	99.845	100.700	100.146	108.269
Hygroscopic moisture.....	1.441	2.245	2.512	4.518
absorbed at.....	28 C.°	25 C.°	14.5 C.°	14.5 C.°

[According to these analyses, these soils are of a very light character, especially as regards Nos. 3, 7, and 8, in which, also, potash is quite low; and in 3 and 8, as well as in 9, phosphoric acid is deficient. Their fair productiveness, as stated in the text, must be due to the nature of the subsoil, of which no specimens were furnished for analysis. Doubtless the duration of productiveness will be found sensibly proportional to the closeness of the red clay subsoil to the inferior surface soil. The moisture coefficient of Nos. 3 and 7 is also very low, rendering them subject to drought unless quite deeply tilled, so as to intermingle them with the more retentive subsoil. Deep culture is, therefore, to be especially recommended, and phosphate fertilizers will be first needed in Nos. 7, 8, and 9.—E. W. H.]

The following analyses were made by Professor Shepard, and were published in *Tuomey's Agricultural Survey of South Carolina*, in 1848:

No. 14. *Cultivated soil* from the cotton lands south of Columbia, Richland county.

No. 15. *Cultivated soil*, taken near Bennettsville, Marlborough county.

Cultivated cotton lands of Pedee river.

	RICHLAND COUNTY.	MARLBOROUGH COUNTY.
	Soil.	Soil.
	No. 14.	No. 15.
Insoluble residue.....	76.50	77.30
Potash and soda.....	Trace.	0.00
Lime.....	1.00	0.80
Magnesia.....	0.50	1.00
Iron.....	2.40	5.00
Alumina.....	6.60	4.80
Organic matter.....	9.00	5.40
Water and loss.....	4.00	5.70
Total.....	100.00	100.00

[Little can be learned from these analyses, except that the soils are moderately clayey and retentive and contain a high percentage of lime, a notable advantage over the upland soils, and rarely unaccompanied by an adequate supply of other ingredients of plant food.—E. W. H.]

The Pedee lands were little esteemed formerly, and seventy-five years ago many of them were considered so impoverished by cultivation as to have been abandoned by their owners for the fresh lands of Alabama. Under the present system of culture they are the most productive and certain in the state. Their great productiveness must be largely attributed to their excellent and judicious management, by which lands naturally yielding only from 300 to 400 pounds of seed-cotton per acre are made to give a bale of cotton, one year with another. A good, though not a thorough drainage by open ditches has lowered the water level in these lands at least 4 feet. The physical properties of the soil lend themselves readily to improvement. The sandy surface soil, although thin, is very fine, and the clay is of so fine a texture as to be usually described as floury. It is noteworthy, also, that fresh land of a grayish color, or where the plow turns up the subsoil of a yellowish or reddish cast, blackens on exposure, and becomes darker year by year as they are cultivated. The exemption from drought, which these lands in large measure enjoy, while greatly due to their drainage and good tilth, may depend somewhat on the body of live water in the quicksand, which underlies them at a depth of from 15 to 25 feet, and whose ascent in hot dry seasons through the fine texture of the intervening clays is not unlikely.

Swamps.—The swamps, covering 1,000 square miles of this region, are of two descriptions:

1. *The river swamps.*—The soil is of a mulatto or mahogany color, and is a heavy alluvial loam, rendered lighter sometimes by an admixture of fine sand and mica, when they are called "isinglass lands". Such swamps are found on the banks of the Savannah, the Santee, the Congaree, Wateree, and Pedee rivers, varying from narrow strips to broad bottoms 6 and 8 miles in breadth.

The following analysis of the alluvial soil of Savannah river at Edgefield was made for the Patent Office by C. T. Jackson, M. D., in 1857:

Upper alluvial lands of Savannah river.

	No 16.
Insoluble matter.....	78.000
Potash.....	1.000
Soda.....	0.730
Lime.....	0.200
Magnesia.....	0.200
Manganese oxide } Peroxide of iron }	4.850
Alumina.....	10.040
Phosphoric acid.....	0.310
Sulphuric acid.....	Trace.
Chlorine.....	0.050
Humic acid.....	0.400
Insoluble vegetable matter.....	4.300
Total.....	100.140

[If the methods used in making this analysis were such as to render it comparable with those made in connection with the census work, it shows this soil to be very unusually rich in potash and phosphoric acid, and fairly supplied with lime. From the high percentage of alumina, it would seem to be a very heavy soil. If, however, the methods used were such as to give the ultimate composition (as seems likely from the high percentage of soda), no information of practical value is conveyed by it.—E. W. H.]

The body of these swamps lies below the point where the above sample was obtained, and its lands are probably more fertile. Such soil, well cultivated, yields, without manure, from 1,200 to 1,500 pounds of seed-cotton, and from 40 to 75 bushels of corn per acre. These lands were being rapidly cleared and cultivated anterior to the war; but since then they have been to a great extent abandoned for the higher and more easily tilled uplands. The freshet of 1865 broke the dams on the Great Pedee that excluded the freshets, and they have never been repaired. These lands are subject to overflow, and the erection of levees for protection has been only practiced here and there by large planters. In the absence of records showing the risk from freshets to these lands, the following extract from a plantation record kept by James H. Hammond is taken. The island field is at Silver bluff, on Savannah river, and lies rather lower than the average of the Savannah river swamps. It received no manure, and being small and of little moment in the larger operations of the plantation, it had hardly average care bestowed upon it. It was planted continuously in corn and pumpkins (no record kept of the latter crop, which was always abundant). The years not entered are due to the absence of the proprietor, the land being planted as usual:

Year.	Acres planted.	Crop.	Year.	Acres planted.	Crop.	Year.	Acres planted.	Crop.
1838.....	25	<i>Bushels.</i> 925	1844.....	25	<i>Bushels.</i> 850	1851.....	25	<i>Bushels.</i> 587
1839.....	25	950	1845.....	25	500	1852.....	25	800
1840.....	15	450	1847.....	10	832	1854.....	30	600
1841.....	20	675	1848.....	25	974	1855.....	30	240
1842.....	25	2,075	1849.....	25	1,000	1856.....	30	900
1843.....	20	895	1850.....	25	250	1860.....	25	600

During these twenty-three years only one crop was seriously damaged by freshets, viz, the great August freshet of 1852, which injured one-third of the crop, so that it could only be fed to hogs. The average yield was 35 bushels per acre; fluctuations of yield from 8 to 85 bushels were due to the seasons to a very small extent, and resulted chiefly from neglect of this field for larger interests.

2. *Bays, or upland swamp and creek bottoms.*—These occur on the smaller streams, and rarely exceed 2 miles in width; they are also found in bodies of several thousand acres in the pine lands, on the second levels from the rivers—probably ancient lakes choked up with water growth. The soil is black, consisting largely of decomposed vegetable matter, with a depth of from 3 to 15 feet, resting usually on white sand.

The following analysis of a sample taken from the swamp of South Edisto river, was made by Professor Shepard:

South Edisto swamp-land soil.

	No. 17.
Insoluble residue	60.000
Potash and soda	Trace.
Lime	0.500
Oxide of iron	2.400
Alumina	4.000
Organic matter	28.000
Water and loss	5.100
Total	100.000

From 1845 to 1860 much in the way of clearing these lands was done. Since then they, of necessity, have been much neglected, and are relapsing into their original state. They are not suitable for cotton, but produce large crops of corn. The Cowden plantation gave for twelve years, without manure of any sort, an average yield of 35 bushels of corn per acre, on a field of from 600 to 900 acres. In one year 600 acres gave an average of 62½ bushels of corn per acre, but now it does not produce corn enough to feed the stock of the negro renters, who are cultivating patches of cotton on its margin, owing to the abandonment of all care for the drainage.

Under the system of agriculture at present pursued, the chief attention is paid to the more easily tilled but less fertile uplands. Nevertheless, there is in the upper pine belt a body of 600,000 acres of productive corn land, now almost wholly neglected, but once cultivated with great profit (when corn was worth only 50 or 60 cents a bushel), and capable of yielding 50 per cent. more than the entire corn crop of the state.

PRODUCTIONS.—The staple crops are cotton, corn, oats, rye (the southern variety), wheat (to a limited extent), peanuts (yielding an average of 40 bushels per acre), sweet potatoes, and rice. The culture of indigo and tobacco has been abandoned, though once found profitable. The olive, the Italian chestnut and pine, the varieties of mulberry, the fig, peaches, apples, pears, pomegranates, plums, pecan nuts, English walnuts, grapes, etc., are successfully grown.

Considerable attention is paid in some localities to forest products, turpentine, pine timber, cypress shingles, and white-oak staves, and but little to stock raising. From 90 to 95 per cent. of the work stock, oxen excepted, are imported. Cattle, hogs, and sheep depend almost entirely for their support upon such food as the range furnishes, with as little looking after as the first settlers bestowed on their wild herds. Mills gives the stock in Orangeburgh county in 1825 as follows: Cattle, 25,000; sheep, 10,000; swine, 50,000. In the census of 1880 there were reported: Cattle, 16,447; sheep, 3,758; swine, 37,156—a decline in the total of over 20,000, notwithstanding the population has increased from 15,563 at that time to 41,395 in 1880, agriculture remaining still their chief pursuit. Beside clay for bricks and marl (except a deposit of iron ore near High Hill creek, Orangeburgh), no minerals of value have been discovered in this region. The Pedee is the last river to the south where herring are caught in large numbers. Shad in the spring and sturgeon and rock-fish in the summer and autumn ascend all the rivers in this region, except that shad never enter the waters of the Little Pedee, although they are clear and deep like those of the Edisto.

STATISTICS.—The upper pine belt covers about 4,630 square miles, and has a population of 221,409, or 47.8 to the square mile, bearing in this regard about the same proportion to the other regions of the state that it did in the enumeration of 1870. The percentage of colored population is 60, against 63 in 1870.

The area of tilled land is 948,521 acres, being 205 acres to the square mile, or nearly one-third of the entire surface. This is an increase of 167,497 acres over the enumeration of 1870, and by no means proportionate to the increase in the population since that date.

The lands under cultivation average 4.2 acres per capita of population, and 21 acres per head of live stock. Being of easy tillage it not infrequently happens that 45 acres (exclusive of small-grain acreage) is well cultivated with each mule. The acreage devoted to the culture of cotton is 358,505, and comprises more than one-third of the tilled lands, 26 per cent. of the total cotton acreage of the state, or 9½ of the area of the region, the average being 1½ acres per capita of population, or 10 acres per work-animal; 418,417 acres are in grain crops of all kinds,

including corn, small grain, and rice; 169,796 acres are in fallow, and in other crops. As fallowing is not regularly practiced in the husbandry here pursued, and as the other crops include only sugar-cane, potatoes, orchards and gardens, almost exclusively for local use, and consequently small, this figure includes some of the corn lands whose culture has been so largely abandoned.

The *farms* number 19,649, averaging nearly 50 acres of tilled land to the farm, which is the largest average in the state. Their relation, however, to the population remains about the same as in the regions south of this, viz, one farm to 12½ of the population; northward, the number of farms increase in proportion to the population.

The production of cotton in 1879 was 148,050 bales against 83,210 in 1869, an increase of 70 per cent., and comprises 28 per cent. of the total production for the state. The average yield per capita is 981 pounds of seed-cotton, the largest, except in the comparatively small red-hill region, where it is 1,044 pounds. The yield per acre is 606 pounds seed-cotton, which is also larger than elsewhere, except for the small crop of the lower pine belt. In Marlborough county the yield per acre averages 828 pounds seed-cotton, and the yield per capita 1,608 pounds. This is the maximum product in the state, and entitles the region to its designation as the central cotton belt of Carolina.

The grain crop is 3,631,302 bushels, an increase of 1,500,000 bushels on the returns of 1870. This includes corn, small grain, and rice, and constitutes 21 per cent. of the grain crop of the state. The average is 16 bushels per capita of the population, and 8.6 bushels per acre. Allowing 80 bushels a year to the head of work stock, the 35,469 head in this region would leave less than 800,000 bushels for the population, 3½ bushels per capita with nothing for the other live stock. The maximum average product is attained in Marlborough, 10½ bushels per acre, 20½ bushels per capita of population.

The live stock number 313,811, which is an average of 1 to every 9 acres, 16 to each farm, 1.4 head to each one of the population, 2 to the bale of cotton, and 1 to every 1.1 bushels grain produced.

RED-HILLS REGION.

The very gentle ascent of the upper pine belt attains on its northern margin an elevation of from 200 to 250 feet above the sea-level, and an irregular and interrupted line of hills is then encountered. These hills rise 200 or 300 feet above the plain south of them, and this greater elevation is not unfrequently reached in traversing a few hundred yards. From their tops extended views of the gentle and regular slope of the "lower country" are exposed to the south and east. To the north and west a sort of table-land, broken on the streams, stretches back, gradually thinning out on the higher and more rolling sand-hill region of the state.

The general trend of these hills corresponds pretty nearly with that of the other regions of the state, being northeast and southwest. Starting above Hamburg, on the Savannah river, they sweep northward and eastward across the western part of Aiken and the northern part of Barnwell county. Following the northern line of Orangeburgh county they attain their greatest breadth on the Santee river just below the junction of the Congaree and Wateree rivers. West of the Santee river their course is more northerly, and they form here that remarkable line of hills traversing Sumter county long known as the "high hills of Santee".

While the red hills form a well-marked belt across the state below the sand hills proper, from the western part of Aiken to the northeastern corner of Sumter county, they are not continuous, but are interrupted at greater or less intervals by the intrusion of the sand hills from above. Mills' description of the high hills of Santee gives a clear idea of this. He says:

They take their rise about 9 miles north of Nelson's ferry (on the Santee river) and form that fine body of "brick mould" land in the Richardson settlement. After continuing about 8 miles they suddenly become sand hills. At the end of 11 miles they become red land again, which continues to Buck creek, above Statesburg (9 miles). These hills up to this point appear to hang over the Wateree swamp; but now they diverge and turn to the northeast, with one ridge in the middle forming a backbone, breaking off into steep hills toward the Wateree and sloping off gradually toward Black river. At Buck creek the hills again become sandy, which gradually increases to Bradford springs (15 or 16 miles). A little above this place they join the sand hills of the "middle country".

The ridge lands along the southern line of Edgefield county have been included in this region; for although they lie above the lower outcropping of the granitic rocks and between these and the clay slates on the north, they so closely resemble the red lands, here mentioned, in soil, growth, elevation, and physical features generally, that the same description will cover both.

TIMBER GROWTH.—The long-leaf pine thins out on these hills, and is even replaced sometimes by short-leaf pine of large growth. The characteristic timber growth, however, is large oak and hickory. All the oaks of this section attain here an unusual size, including the post and the black-jack, but the red oak surpasses them all, measuring sometimes as much as 7 feet in diameter, while trees 4 and 5 feet through are not uncommon.

CLIMATE.—The differences between the climate of the red hills and of the region south of them is due almost entirely to the difference of elevation. Being from 200 to 300 feet higher, they enjoy a drier, more bracing, and in some regards a warmer atmosphere. While these heights are not more subject to the severer influence of storm-winds than the surrounding country, the ordinary movements of the air are more constant and perceptible there than elsewhere. During the extreme heats of summer there is scarcely a night when these hills are not visited by refreshing south winds. In ascending them in the cool evenings of autumn, at a certain point you pass suddenly from a cold air into one several degrees warmer, the difference being strikingly perceptible.

Killing frosts are generally a week or two later in fall, and not so late by the same period in spring as in the plain below. These advantages made this region at one time famous for its fruits. The long-staple sea-island cotton has been tried here and found to mature well, and it is not improbable that with the same nice care and attention that is given to this crop on the sea islands it might be successfully grown here. Such was Governor Seabrook's opinion. These hills, and especially the high hills of Santee, were formerly much frequented by planters from all parts of Carolina, and even of other southern states, as health resorts during the summer months. The whole region is remarkably healthy and free from epidemics of all sorts. During the severest winter of the last half century, the banana and the sago palm, standing in the open ground and protected by only a few handfuls of cottonseed around their roots, though killed down, preserved sufficient vitality to throw up vigorous shoots in the ensuing spring.

SOILS.—The soils of this region are yellowish red loams, similar in appearance to the mulatto soils derived from the hornblende rocks in the "upper country," but not so tenacious or waxy. They become hard in dry weather, but in wet weather, owing to the amount of sand they contain, the intervals when they cannot be worked are short. Vegetable matter rots rapidly in them, and for this reason long manures from the stable and barn-yard are better adapted to them than commercial fertilizers, which latter (especially the ammoniated guano) pay better on the sandy soils. Stable manure is well retained by these soils, and they are capable of great improvement by its use. Worked without manure the soils rapidly become unproductive.

The following analyses of typical soils in this region were made for the Census Office:

No. 1. *Virgin soil of red lands*, from the table-land on the place of J. Peterkin, 3 miles below the junction of the Wateree and Congaree rivers, Orangeburgh county; taken 12 inches deep; timber growth, large red oak, hickory, dogwood, and a few very large short-leaf pines.

No. 2. *Soil of the red lands*, near the above. It has been cultivated more than 100 years, having been an old Indian field. It contains 375 acres, and in 1879 produced 250 bales of cotton. When the sample of soil was taken there was a crop on it estimated at 1,200 pounds of seed-cotton to the acre. The field had only received cottonseed and some commercial fertilizer as manure for a number of years previously.

Red lands soils.

	ORANGEBURGH COUNTY.	
	Virgin soil.	Soil cultivated 100 years (fertilized).
	No. 1.	No. 2.
Insoluble matter	88.960	89.340
Soluble silica	3.055	2.847
Potash	0.115	0.138
Soda	0.059	0.083
Lime	0.062	0.077
Magnesia	0.028	0.061
Brown oxide of manganese	0.098	0.006
Peroxide of iron	1.250	1.550
Alumina	3.970	3.606
Phosphoric acid	0.096	0.087
Sulphuric acid	0.047	0.038
Water and organic matter	2.621	1.038
Total	100.361	99.640
Hygroscopic moisture	1.982	1.444
absorbed at	26.6 C.°	26.6 C.°

The following analyses have been taken from Professor Tuomey's report of the survey of South Carolina, published in 1848:

No. 18. *Red soil* from near Orangeburgh village, about the line of junction of the buhr-stone and Santee marls, Orangeburgh county.

No. 19. *Red soil* from Lang Syne, near Fort Motte, Orangeburgh county.

No. 20. *Red soil* from the high hills of Santee, near Statesburg, Sumter county.

	ORANGEBURGH COUNTY.		SUMTER COUNTY.
	Soil.	Soil.	Soil.
	No. 18.	No. 19.	No. 20.
Insoluble residue and silica	66.90	71.00	80.30
Potash and soda	Trace.	0.50	.....
Lime	2.00	1.58	0.90
Magnesia	0.50	1.00	Trace.
Oxide of iron	6.00	4.00	3.70
Alumina	9.60	8.50	6.60
Phosphoric acid .....	.....	.....	.....
Organic matter	5.60	7.00	4.40
Water and loss	9.40	6.44	4.10
Total	100.00	100.00	100.00

[These two sets of analyses exhibit wide differences in the composition of the soils of the region. The prominence of lime in Nos. 18, 19, and 20 furnish a presumption of high and permanent productiveness, while Nos. 1 and 2 would appear very much inferior in both respects, and their productiveness is probably due to their subsoils.—E. W. H.]

STATISTICS.—The red-hills region contains about 1,620 square miles, and has a population of 44,816, being 27.6 persons to the square mile; 56 per cent. are colored. The area of tilled land is 234,682 acres, being 144 acres per square mile, or 22 per cent. of the entire surface, and 5 acres per capita of the population. The number of farms is 4,568, being 2.8 per square mile, a farm to every 10 persons, averaging 228 acres, 50 of which is under cultivation to the farm, the remaining 178 acres being uncleared, and for the most part yielding no return whatever. The crops are cotton, corn, and small grain. Cotton, in which 84,939 acres were planted in 1879, yielded 34,249 bales. The average yield per acre was 192 pounds lint, and per capita 363 pounds lint, the largest yield per capita of any region of the state. This is a little more than 6 per cent. of the whole area planted in cotton in the state, and the yield 6.6 per cent. the total yield of the state. In grain of all kinds 114,425 acres were planted, yielding 804,443 bushels, a little over 7 bushels per acre and 17 bushels per capita of the population. This area is a little over 6 per cent. of the total area planted in grain in the state, and the crop is $\frac{47}{100}$ of the crop of the state. This yield is wholly disproportionate to the capabilities of the soil, which is particularly adapted to small grain. Rice, the most productive grain crop in the state, is little planted, and this in part accounts for the falling off; but lands which in 1825 (see Mills, p. 660) made an average of from 8 to 12 bushels, and when manured 34 bushels of wheat to the acre, and an average of from 10 to 25 bushels of corn to the acre, and still more when sown in rye and oats, are far below their normal production when yielding as above indicated. In other crops and fallow there are 35,318 acres, nearly 15 per cent. of the tilled land. The culture of much of this land is abandoned as a consequence of the disaster, incident to the late war, to the rich planters who formerly lived here.

The work stock numbers 7,663, not quite 5 to the square mile; 1 to every 30 acres of tilled land, and 1 to every 6 of the population.

The live stock is 61,569, chiefly hogs; being 38 to the square mile, and nearly 1 to every 4 acres of cultivated land. The larger portion of them are the property of persons owning no land and planting little grain. They are thus almost wholly dependent for subsistence on the range, or on depredations on the growing crops, and yield little in meat or manure in return. It yet remains to organize a stock husbandry for this as well as for most other sections of the state.

THE SAND-HILLS REGION.

The belt of sand hills stretches across the state from a point opposite Augusta, Georgia, to the intersection of the North Carolina line by the great Pedee river. The average distance of its lower border from the sea is 95 miles. Its length is 155 miles; its width is variable, the maximum in Lexington county being 30 miles, and the average about 20 miles. In the central part of the state, along the Congaree river, the granite rocks on which Columbia stands, outcrop down the stream until they touch the broad flats of the upper pine belt that extend out from the eastern bank, so that at this point the sand hills disappear, and the region is divided into an eastern and a western portion. It occupies the larger portion of the five central counties of the state, viz, Aiken, Lexington, Richland, Kershaw, and Chesterfield. Sand hills, similar in every respect to the typical sand hills of this region, appear in restricted localities in several other parts of the state, as in Barnwell and Clarendon counties, and, what is more remarkable, among the rocky hills of the "upper country", as in Lancaster and Abbeville. In the latter county, near Dorn's gold mine, there is, for instance, a tract of sand-hill land not more than six acres in extent, where the coarse white sand supports the characteristic growth of long-leaf pine and forked-leaf black-jack oak, no specimen of which is to be met with in a day's ride of 40 or more miles in any direction from this spot.

SURFACE FEATURES.—The surface features of the region are of a monotony aptly characterized by the term "pine barren" which is applied to it. The sand hills rising from the Savannah river attain at the village of Aiken an elevation of 600 feet above the sea, and there is a slight incline to the valley of the South Edisto river. Between the two Edistos there is a high sand ridge. Beyond the North Edisto a gradual ascent is resumed, until an elevation exceeding 700 feet is reached in Platt Springs township, in eastern Lexington. Hence there is a rapid descent of more than 500 feet to the Congaree river. East of the Congaree the rise is again gradual, and the maximum elevation is attained on the further border of Richland county, where the hills once more descend abruptly to the Wateree river. Beyond this river there are no data as to levels, except that on the water-shed of the Great Pedee river there is evidence that the surface has suffered denudation to the depth of 150 feet or more. This evidence is furnished by a small conical hill, known as Sugar-Loaf mountain, rising in central Chesterfield, 150 feet above the surrounding country. The hill is composed of strata of sand and kaolin, similar to the general sand-hill formation, and has been preserved from denudation by blocks of ferruginous sandstone covering its top and sides, identical in character with the same sandstone found on the surface at many places among the sand hills.

As already stated elsewhere, the long slopes face southwest, and the short slopes face northeast, and, in general, the elevation of the western portion of the state is greater than the eastern. The spring branches, and even streams of considerable size, sink into the sands of this region and are lost or reappear at distant points in the form of springs, called "boiling springs", which issue from the earth with considerable force, throwing out no inconsiderable amount of fine sand to be conveyed onward by the streams. It is to the undermining action thus carried on by these underground drains that Professor Tuomey attributed the occurrence of numerous circular depressions of the surface, met with on the elevated flats of this region and holding ponds of water during a considerable part of the year. Another curious phenomenon, doubtless connected with these streams, is, that where wells have been bored through these loose sands, sometimes to a depth much exceeding 100 feet before reaching water, it has been found that a current of air ascends from the well. This current varies in force, and in one well of six-inch bore at Mr. R. H. Hankinson's, in Aiken county, it would blow with such force for some hours previous to a storm, as to be heard at a distance of several yards, and was able to throw a felt hat, placed over the orifice, with some force into the air. But notwithstanding the great dryness of these pine barrens, they are well watered, being crossed by seven rivers of considerable size, having an aggregate length of more than 200 miles among the hills. Of creeks, not counting smaller streams and branches, there is an aggregate length of 1,200 miles capable of furnishing abundant water-power. For instance, Horse creek, an average stream out of 78 of like character, furnishes in the single township of Gregg, in Aiken county, motive power for three large cotton factories, besides a large paper-mill and other mills, aggregating 1,150 horse-power, and moving 46,720 spindles without having its entire capacity employed. The waters of these creeks are of great purity, being as clear and sweet as the best spring water. On the margins of these streams there are more than 100,000 acres of bottom lands, for the most part uncleared, but capable of being rendered productive in the highest degree by drainage and irrigation.

Timber growth.—The long-leaf pine here attains its highest perfection, trees 6 and 7 feet in circumference being of not unusual occurrence. The wood is also of better quality, having less sap and more heart, the latter being more resinous than elsewhere, and the names of creeks, springs, and neighborhoods are often derived from it, as "lightwood", "lightwood-knot," referring to its valuable qualities as fuel. But even this tree becomes stunted on the higher and finer sand ridges and gives its place to the New Jersey tea-plant (*Ceanothus americanus*), which alone covers the dazzling whiteness of the sand. There is an undergrowth of forked-leaf black-jack oak, and, wherever there is any underlying clay or suspicion of moisture, of the round-leaf black-jack oak. The annual fires check this growth, which would otherwise successfully contest the soil with the pine and thereby add largely to its fertility. The juniper is abundant in some localities, and is manufactured into buckets and tubs. On the hillsides, where there is an outcropping of pipe clay, masses of kaolin add a pleasing variety to the monotony of the pine growth.

CLIMATE.—The climate of the sand hills is dry, tonic, sunny, and stimulating, and entirely free from malarial influences. The region has long been a notable health resort during winter for consumptives from northern

latitudes, and during summer for persons from the lower country seeking fresher and purer air, free from every taint of malaria. The inhabitants themselves enjoy an unusual degree of health, and cases of longevity are common. The death rate is low; *e. g.*, in Platt Springs township, Lexington county, in a population of 853, there were two deaths in 1879, and in 1880, four deaths, three of which were of persons over eighty years of age.

The mean annual temperature is 62.50° F.; the winter mean, 48.53° F.; the spring mean, 55° F.; the summer mean, 75° F.; the autumn mean, 71°; but excluding August (the hottest month of the year), the mean for autumn, *i. e.*, for September and October, is 68° F. The average diurnal range of temperatures is 12.65° F., and unsurpassed in point of equability by any of the important health resorts in the United States, except San Diego, California. Frosts may be considered as over after the middle of March, though sometimes a straggling frost has taken vegetation by surprise even as late as the 26th of April. The period of the year without frost has an average duration of from 200 to 225 days, and even during mid-winter frosts are not of frequent occurrence.

The elevation, and the porous subsoil of land, in which water rests only at a depth of from 80 to 150 feet, renders this a remarkably dry climate. Steel instruments may be exposed for months without rusting, matches left open never miss fire, moth and mold are rarely seen, and the Cryptogamous plants are feebly represented. Observations at Aiken show that the relative humidity of the air is 64.04 per cent., being less than at any of the celebrated health resorts of Europe, Hyeres and Cannes excepted. Heavy dews never occur; fogs are still rarer. The number of days on which rain falls varies from 29 to 45; of the remainder, from 216 to 239 are clear, leaving from 84 to 107 days as cloudy or partially cloudy.

During sixteen years the rainfall at Aiken averaged 46.70 inches, varying from 33.87 to 56.49 inches. The average fall in winter is 9.02 inches; in spring, 14.44 inches. The heaviest monthly rainfall of the year—viz, 6.04 inches—occurs in April, which usually has a larger proportion of bright clear weather than any other period. In summer the average rainfall is 12.23 inches; in the fall, 10.79 inches. During five years six falls of snow were recorded, but as a rule there were only a few flakes, that melted on touching the earth. Sleet is more frequent than snow, but disappears on a few hours' exposure to the sun.

The prevailing winds are from the south and southwest. The drinking-water, filtered through great thicknesses of sand, is transparently clear and of exceptional purity. The temperature of wells and springs varies from 62° to 64° F. (*Climate and Topography of Aiken*, E. S. Gaillard, M. D., Richmond, Va.; and *Aiken as a Health Station*, by W. H. Geddings, M. D.)

It must be remembered that this description applies to no restricted locality, but refers to an area of more than 2,000 square miles, where the sanitary conditions alluded to are present with the healing and terebinthinate odors of the great pine forest.

SOILS.—The characteristic ingredient of the soil of this region is the loose rounded sand which forms its chief constituent, and which sometimes reaches to a depth of from 100 to 150 feet without change, as shown in wells. Subsoils of yellow sand are frequently met, and on the hillsides there are outcrops of clay, white or mottled and variegated in color, the hues ranging through yellow, buff, red, and purple. There are hills of sand of great fineness and exceeding whiteness and purity, but generally the sand is coarse; the ridges and hilltops are very barren. The high flats are more productive, and the less elevated flats are often quite productive, being cultivated with great ease, and "continuing to produce as long as there is a particle left of anything that can sustain a plant".—(*Tuomey*). The organic matter in the surface soil consists largely of minute fragments of charcoal, a residuum of the pine straw (leaves) left by the forest fires, which it is still the bad practice to set out yearly, in order to sweep off all undergrowth for the sake of the very scanty pasturage upon which the stock, ranging at large, subsists.

The following analyses of these soils were made by Professor C. U. Shepard, sr., in 1846:

No. 21. *Virgin sandy soil* from near Aiken, Aiken county.

No. 22. *Sandy subsoil* of No. 21.

No. 23. *Cultivated sandy soil* from Platt Springs, Lexington county.

Soils of the sand-hills region.

	AIKEN COUNTY.		LEXINGTON COUNTY.
	Soil.	Subsoil.	Soil.
	No. 21.	No. 22.	No. 23.
Insoluble residue and silica	77.000	81.000	80.000
Lime	0.050	0.400	0.600
Magnesia	Trace.	Trace.	Trace.
Oxide of Iron	4.005	3.500	3.000
Alumina	5.000	5.500	5.000
Phosphates	Trace.	.....	Trace.
Organic matter	8.500	.....	0.500
Water and loss	5.500	9.600	4.300
Total	100.055	100.000	100.000

[These analyses seem to show a soil extremely poor in the ingredients of plant food, but redeemed from sterility by relatively large supplies of lime and organic matter. Their proportion of clay also seems to be larger than is indicated by the description, thus rendering them remarkably retentive.—E. W. H.]

Since the introduction of commercial fertilizers, especially the ammoniated fertilizers, good crops have been produced on lands of this character, formerly considered of little value. As a consequence, some of these lands near the railroad, which were sold in 1858 at \$3 an acre, have recently brought as much as \$30 and even \$40 an acre. Throughout this region there are thousands of acres of land equal and superior to these, but remote from the lines of railroad, for sale at from \$1 to \$5 an acre. Even the more barren soils of this region have been made to yield remunerative crops by good culture and manuring.

On the apparently barren hilltops of this vicinity there once flourished a most remunerative culture of the peach. Grapes, figs, and all early fruits do well, and these are the soils adapted above all others to the culture of the watermelon. Many years ago these soils, in Lexington and Kershaw counties, were considered as peculiarly suited to the culture of the castor bean. A crop of 150 gallons of oil per acre was obtained with the crude processes then employed for its extraction. Sorghum also makes a larger yield of a better quality of sirup on these lands than it does on lands much more productive for other crops.

STATISTICS.—The area of the sand-hill region is estimated at 2,440 square miles. The population is 28,612, being 12 persons to the square mile, a little over one-third of the average of the state, and less than in any other region. Fifty-nine per cent. of the population is colored. The area of tilled land is 151,359 acres, and is 62 acres to the square mile, or about one-tenth of the entire surface. This is considerably below the average of the state and less than in any other region except in the lower pine belt, where it is only 49 acres per square mile. But it is 5½ acres per capita of the population, the largest proportion, in the state; this is due to the small number of towns and railroads in this region, leaving the rural population more exclusively to agricultural pursuits.

The tilled land is divided among 4,238 farms giving 35 acres of tilled land to the farm; this is 5 acres less than the average of the state. The number of farms in proportion to the population is greater than anywhere else, being a farm to every 7 of the population. More farms here are worked by their owners and fewer by renters than elsewhere in the state. Thus in Kershaw and Chesterfield counties 60 per cent. of the farms in the sand hills are worked by the owners, while in the portions of these same districts embraced in the upper pine belt, and the metamorphic region, only 44 per cent. of the farms are worked by owners, the remainder being rented. The predominance here of this independent small proprietary has exercised an influence on the agricultural policy of the state; the long opposition to any change in the onerous fence law has been largely due to them. The abundant timber made fencing cheap, and the extensive areas of wood land offered a wide range (although a scanty pasturage) for the live stock. Of the crops cotton embraces 35,433 acres, 2 per cent. of the entire surface. The yield is 15,055 bales, 6½ bales per square mile, 11 bales less than the average of the state, and less than elsewhere except in the lower pine belt and in the coast region. The yield of lint is about 193 pounds per acre in cotton, 12 pounds above the average of the state, and is due to the large area from which the small number of acres planted is selected, rather than to any superiority of soil or culture. The yield per capita is only 239 pounds of lint; less than elsewhere in the state north of the lower pine belt and south of the Piedmont region.

Corn and other grain crops embrace 93,283 acres. The yield is 920,444 bushels, a fraction less than 10 bushels per acre, but 32 bushels per capita of the population, nearly double the average of the state, and 12 bushels per capita more than the yield in the next highest—the Piedmont—region. This is another result of an independent small proprietary, and of a rural population remote from the thoroughfares of travel and of trade, and relying on their own resources for subsistence. In all other crops and fallow there are 22,643 acres, most of which is in orchards and gardens.

The number of work stock is 8,518, being 3.5 per square mile. This is less than in any other region of the state, except among the extensive unimproved forests of the lower pine belt, where the proportion is only a little more than half the above. The ratio of work stock is 0.29 to one of the population. This is nearly double the average of the state, and is owing, partly, to the larger proportion of the rural population, and, consequently, of farmers employing work stock; partly to the small independent farm holdings, separated by wide tracts of unimproved land, precluding co-operation in the matter of farm animals; partly to the small proportion of crops worked by hand—such as cotton and rice—and the larger proportion of land in corn and other grain cultivated chiefly by horse-power; and, also, to the greater facility and cheapness of keeping stock on home-raised supplies than on corn and hay purchased from the north and west. These same reasons will also account for the rather extravagant use of work stock, there being only 17 acres of tilled land to the head, which is 7 acres less than the average of the state, although the lands are light and of very easy culture.

There are 70,901 head of live stock of all kinds, being only 29 to the square mile, which is 8 less than the average for the state, and less than anywhere else in the state except upon the coast and in the lower pine belt, although the farmers of this region esteem stock-raising as their most important pursuit. Their opinion is, however, justified by the additional fact that there is here 2.47 head of stock to each one of the population, which is nearly double the average of the state. This agrees entirely with the rule clearly demonstrated in the tables on page 44, that the number and value of live-stock increases directly as the area of cultivated land increases. The conditions of stock-raising have entirely changed since the first German settlers of Saxegotha township (now Platt Springs, Lexington county) were "cow-pen keepers" here, and who, as De Brahm writes, "determine the number of their flocks by the number of calves, which they mark every spring and fall. If one marks 300 calves

per annum he reckons his stock to consist of 400 heifers, 500 cows, and 300 steers—1,500 head in all, besides horses.”—(*Philosophico Historico Hydrogeography of South Carolina*, 1771). Davyd Ingram wrote of these regions, 1568-’69: “There is alsoe great plenty of Buffes, beares, horses, Kyne, wolves, foxes, deare, goates, sheepe, hares, and conyes; the moste pte beinge wylde, the Hydes & Skinnes of them are good mchaundize.”

What has been said in regard to the general management of the soil, and the culture of crops, and the wages of labor in the upper pine belt applies to the sand-hills region. The only noteworthy difference here is that agriculture is more self-sustaining, fewer supplies are purchased, the lien business is very small, less land is rented, and more of it is cultivated by the proprietors of the soil, the field work to a large extent being done by them. The population is simple, frugal, healthy, and industrious, and are more employed in small handicraft than elsewhere. The region, although crossing the central portion of the state, is not traversed by any of the lines of railway, and retains unaltered much of its primitive customs and methods.

THE METAMORPHIC REGION.

The metamorphic region of South Carolina coincides very nearly with what is known as the “upper country” of the state. It includes the whole of the eight counties of Abbeville, Anderson, Newberry, Laurens, Union, Fairfield, Chester, and Lancaster, and also embraces the northern portion of Edgefield and Lexington and the northwestern portions of Richland, Kershaw, and Chesterfield. The southern parts of Oconee and Pickens, and the southern and larger portions of Greenville, Spartanburgh, and York are within its limits. A line drawn from a point on the Savannah river, 3 miles above Hamburg, to Columbia, and curving thence northeast to where the Great Pedee river crosses from North Carolina into South Carolina, defines in a general way its southern border. Its northern boundary follows in the main the direction of the Atlanta and Charlotte Air-Line railroad, which lies in the Piedmont region just north of the one under consideration.

SURFACE FEATURES.—The surface features of this division of the state, however, entitle it to the name of the Piedmont region. Its rocks are so similar to those of the Blue Ridge mountains, that though they have been broken down, leveled off, and worn away by exposure, during countless ages, through the vicissitudes of the seasons, they are and always have been the foot hills of the Appalachian range; while the broken and mountainous region to the north usually spoken of as the Piedmont country might be better called the Alpine or sub-Alpine region of the state.

The elevation of 31 points in the metamorphic region, varying from a minimum of 179.5 feet on the granite rocks at the Congaree bridge, below Columbia, to a maximum of 880 feet at Belton, on the Greenville railroad, give a mean elevation above the sea of 590 feet. The mean elevation of the Columbia and Augusta railroad, where it passes along the southern border of the region, is 575 feet; that of the Air-Line railroad, in South Carolina, lying to the north of it, and almost wholly within the Piedmont region, is 910 feet. Between these two lines, therefore, a distance of some 90 miles, there is a general rise of the surface of 335 feet, or less than 4 feet to the mile. This is a gentler slope than that of the Tertiary plain or low country, the distance from the sea to its northern border being about 100 miles, and the difference in elevation something more than 500 feet, or over 5 feet to the mile.

The face of the country presents a gently undulating plain, which becomes more rolling as it approaches the rivers and larger streams, and is finally hilly and broken above the bottoms and narrow low grounds, through which the numerous water-courses find their passage.

The Savannah river, on the western boundary of the state, passes through the metamorphic rocks for more than 100 miles, and although it receives many affluents, and some of them quite large, on its eastern bank, they join it at such an acute angle as to make its eastern water-shed very narrow, scarcely anywhere exceeding 20 miles in width. In the eastern part of the state Lynch’s river passes through this region for about 12 miles, its western water-shed not exceeding 5 miles. Between these two narrow water-sheds in the east and west there is an interval of about 100 miles. The numerous streams traversing this interval belong to one river system, and unite shortly after entering the Tertiary plain to form the Santee river, which has been called the river of South Carolina.

TIMBER GROWTH.—Remarkable changes have occurred in the timber growth of the “upper country” since its settlement during the middle and earlier part of the eighteenth century. The “long drawn beautiful valleys and glorious highlands”, spoken of by Lord Cornwallis, were then interspersed with “forests, prairies, and vast brakes of cane, the latter often stretching in unbroken lines of evergreen for hundreds of miles”.—(*Logan*.) On the highlands the oak, hickory, and chestnut were of large growth, standing so wide apart that a buffalo or a deer could be seen by the pioneer hunters for a long distance. There was no underbrush, and “the woodlands were carpeted with grass and the wild pea-vine, the latter growing as high as a horse’s back. The cane growth was the standard by which the early settlers estimated the value of the land. If it grew only to the height of a man’s head the land was esteemed ordinary, but a growth of 20 or 30 feet indicated the highest fertility. This cane growth not only filled the bottoms, but extended up the slopes to the tops of the highest hills. Thus it was designed to place the

first house built on the present site of the town of Abbeville on the summit of the hill, but afterward, when the tall cane that covered the whole place was cleared away, an error of more than 50 yards was discovered". The trappean soils around Ninety-six, the "flat-woods" of Abbeville, the meadow-woods of Union, and the black-jack lands of York and Chester were prairies with no growth of trees, but covered for the most part with maiden cane. Upper Carolina was then not inferior to any portion of the great west as a grazing country. Buffalo and deer in great numbers roamed through these luxuriant pastures. Henry Foster, a pioneer settler on the Saluda, in Edgefield, counted one hundred buffalo grazing at one time on a single acre of ground in Abbeville county. The original forest has disappeared almost altogether, and has been replaced by younger oaks of small growth, by underbrush, and by the loblolly pines of the abandoned fields. The cane has gone likewise. The wild pea-vine is no longer known, though since the stock has been penned under the new fence law a plant, supposed to be this pea-vine, has appeared in the open woodlands, with several grasses not observed before. The prairies have become covered with a growth of heavy-bodied post and black-jack oaks; the latter in turn is now giving place to the cedar in Chester. The chestnut has been dying out for fifty years; in some localities where it once flourished it has entirely gone, and in others large dead stems and stumps are the only vestige of this valuable and stately tree. The chinquapin and the chestnut-oak are also sickening and dying. During some years past somewhat similar symptoms of disease have appeared in the red and black oak, and fears on their account have been entertained.

The distinctive growth of the region is the short-leaf pine, with a large variety of oaks and hickories. On the water-courses willow, beech, birch, black walnut, ash, poplar, and gum abound. The sycamore sometimes attains a great size, one in York being 28 feet in girth; the tulip tree also is often very large. The sugar maple is found, and another maple of larger growth, and yielding a superior sugar, as to both quantity and quality, is known in Lancaster under the name of sugar tree.

CLIMATE.—The shorter seasons and lower temperatures of the metamorphic region, as compared with those lying immediately south of it, are but slightly attributable to differences of elevation or of latitude, these differences being themselves slight. They result perhaps from greater nearness to the mountains, and, as affecting agriculture, still more perhaps from the heavier clay soils and subsoils, which are more retentive of moisture, and are therefore colder and later in spring than the lighter sandy loams of the lower country. Cotton planting is about ten days later than in the upper pine belt; cotton also blooms later, but by a shorter period, and the same is true of the opening and picking season of the plant, showing that with a later start it grows faster, passing more rapidly through its various stages to maturity. Killing frost occurs from the 15th of October to the 1st of December. This region, however, does not seem to be much affected by that variability of temperature common to localities in proximity with mountain ranges. This is shown by the singular exemption of certain localities here from the injurious effects of late spring frosts. Thus on Rich Hill, a ridge 6 miles broad, between the Pacolet and Fair Forest rivers, in Pacolet township, Spartanburgh county, fruit has been injured by late frosts but once in forty years. Localities in Union also enjoy this immunity in nearly the same degree. In the absence of other records some idea of the temperature may be formed by observations on the temperatures of springs, assuming that this temperature approximates the annual mean. Lieber states as the result of a number of observations that the springs of the Piedmont region have a temperature of from 55° to 58° F., those on a line passing through the center of the metamorphic region one of from 58° to 61.5° F., and below this line one of from 61.5° to 66° F. The only accessible records of rainfall are those published by the Smithsonian Institution, May, 1881. They give an average annual rainfall in this region of 52.34 inches, varying from 44.05 to 60.12 inches. This gives a greater annual rainfall for this region than for those south of it, and places it in this regard next to the areas of greatest annual precipitation in the United States. The spring rains vary from 12 to 15 inches, and in this regard it holds the same relations as in the former to the regions south of it and to the United States. The summer rains are from 10 to 14 inches less than in the regions south of it, and third or midway between the areas of greatest and of least summer precipitation in the United States. The autumn rains are from 8 to 10 inches, and in the counties east of Broad river they are from 10 to 12 inches, being about the same as in the regions to the south, and midway between the areas of greatest and least autumn precipitation in the United States. The winter rains are from 10 to 14 inches, something more than in the lower country, and a little above midway between the areas of greatest and of least winter precipitation in the United States. For the whole year, and in each season of the year, the rainfall is less than in the Piedmont or alpine region north of it. It has been thought that the synclinal axis, running northeast near Allston on the Greenville railroad, has been, during some years past, a line of demarkation between areas suffering from drought to the south of it and those having seasonable rains to the north of it, the first occupying surfaces under which the rocks dip northwest, and the latter one under which they dip southeast.

In point of healthfulness this region leaves little to be desired. When first settled the country was entirely free from all malarial influences. Subsequently, during the period when the first clearing of the forests was in active progress, the hitherto clean bordered channels of the streams became obstructed, in part with fallen timber and brush from the clearings, and in part by the washings of the hillsides. Under the injudicious use of the plow these washings occurred to such an extent as to alter the original level of the surface and to pile the dirt up around the trees in the bottoms until they were killed. This was attended by the prevalence of malarial fevers. Later, the uplands having been cleared and partly exhausted, attention was directed to the drainage and reclaiming of

the low grounds for agricultural purposes, and the healthfulness of the locality was restored. It has thus happened that with the extension of the settlements a belt of malarial influences has moved forward with them, vanishing below and advancing above until it reached the very mountains before disappearing.

SOILS.—The area of land in the metamorphic region, whose culture is impeded by the rocks prevalent there, is comparatively insignificant. This is due to the rather remarkable extent and depth of the disintegration of these rocks. It is a not uncommon occurrence that wells sunk through granite to a depth of 30 or 40 feet require for their excavation no other implement than a spade. Frequently so thorough is the decomposition that the sides of railroad cuts and of mines might be mistaken for a heap of transported materials, did not the existence of seams and quarry veins, which may be always traced on the fresh surfaces, make it certain that the rock had rotted where it stood. The chief impediments to culture are the masses of quartz rocks once forming these veins, but now scattered broadcast over the surface in consequence of the rotting and denudation of the strata that contained them. This is especially the case among the clay slates, and often the first indication which the traveler has that he has entered the metamorphic region is the sight of fields and woods covered with angular fragments of these white quartz rocks. The inclination of the country rocks favors drainage along their edges, and even where the rock is near the surface water seldom collects above them to an injurious extent.

Owing to the frequent transportation and intermixture by mud of the *débris* from the different rocks, the areas of the soils derived from each can be characterized with much less distinctness than the areas occupied by the underlying rocks themselves. Nevertheless these leading varieties of soil may be traced with much clearness, viz., the granitic, the clay slate, and the trappean soils.

Granitic lands.

The granitic soils occupy by far the largest area, as under this head is comprised the soils whose substratum is granite and gneiss, and also those resting on the hornblende talc and mica-schists. These soils are characterized by two distinct names: 1st, the gray sandy soils; 2d, the red-clay soils.

The *gray sandy soils* occupy the ridges and levels, and have been formed by the gradual separation of the siliceous and argillaceous materials found in the *débris* of the decomposing rocks that underlie them. This has been effected by a process of lixiviation, during which the rainwater, not running off, owing to the level nature of the land, sank directly into the earth, carrying down with it the finer particles of the clay through the interstices of the larger particles of sand. This gives a light, loose, warm, sandy loam, varying in depth from 3 to 18 inches, and fine or coarse according to the grain of the rock from which it is derived. The subsoil is red or yellow clay. Such soils are of easy culture, respond readily to the use of commercial fertilizers, and are well adapted for cotton. For these reasons they are much more highly esteemed now than formerly. The following analyses of them are taken from Tuomey's report:

- No. 24. *Gray-sandy soil* from hills near Grindall shoals, Pinkney township, Union county.
 No. 25. *Gray sandy soil* from Saluda, near Mely's ferry, Waterloo township, Laurens county.
 No. 26. *Gray sandy soil* from Tumbling shoals, Sullivan township, Laurens county.
 No. 27. *Gray sandy soil*, on Saluda, Donaldsville township, Abbeville county.

Gray sandy granitic lands.

	UNION COUNTY.	LAURENS COUNTY.		ABBEVILLE COUNTY.
	Soil.	Soil.	Soil.	Soil.
	No. 24.	No. 25.	No. 26.	No. 27.
Insoluble residue	84.80	80.00	80.00	83.00
Potash and soda	0.50	0.60	0.50	.....
Lime	0.50	.....	0.02	0.60
Magnesia	0.40	1.00	.....	0.75
Iron oxide	2.00	3.00	4.00	2.00
Alumina	5.80	7.40	7.00	5.40
Organic matter	3.62	2.00	3.00	1.20
Water and loss	2.88	5.40	5.48	7.05
Total	100.00	100.00	100.00	100.00

The *red clay loams* are the prevailing soils of the hilly and broken country, and occupy slopes of greater or less declivity. The washing of these hills is not so destructive of their fertility as it would have been if the soil were not formed from rocks rotting *in situ*, thus including at every depth all the varied elements of the parent rocks. Thus it happens here that the earth from the bottom of deep wells, usually barren elsewhere, has been found, when spread over the surface, to increase notably the fertility of fields. Gullied spots deprived of all humus.

and every trace of organic matter are, of course, barren for a time, but even their nakedness is soon covered by the old-field pine and their thriftiness is restored. As might be expected, with the clearing of the lands and the washing down of the ridges, the amount of gray lands is diminishing and the amount of red lands is increasing. Tuomey gives the following analyses of these soils in his report:

No. 29. *Red-clay soil* from Liberty Hill, Kershaw county.

No. 30. *Red-clay soil* from Yorkville, York county.

No. 31. *Red-clay soil* from North of Pendleton, Anderson county.

Red-clay lands.

	KERSHAW COUNTY.	YORK COUNTY.	ANDERSON COUNTY.
	Soil.	Soil.	Soil.
	No. 29.	No. 30.	No. 31.
Insoluble matter	74.00	71.60	70.00
Potash and soda	Trace.	0.06	0.60
Lime	1.00	1.40	0.90
Magnesia	0.40	0.50	1.00
Iron oxide	3.50	3.70	2.40
Alumina	10.00	9.40	10.00
Organic matter	2.18	4.50	8.00
Water and loss	8.92	8.84	7.10
Total	100.00	100.00	100.00

The following analyses are of a soil and a subsoil of the same character, from near Spartanburgh, Spartanburgh county. They were collected by Professor W. C. Kerr, of North Carolina, and analyzed for the Census Office.

No. 10. *Yellowish red soil*, taken 5 inches deep; timber growth, post, white, and black oaks, short-leaf pine, and hickory.

No. 11. *Red-clay subsoil*, taken from 5 to 20 inches.

Red-clay lands of Spartanburgh.

	Soil.	Subsoil.
	No. 10.	No. 11.
Insoluble matter	77.860 } 79.650	43.740 } 40.610
Soluble silica	1.790 }	5.870 }
Potash	0.002	0.214
Soda	0.041	0.087
Lime	0.036	0.008
Magnesia	0.070	0.212
Brown oxide of manganese	0.056	0.010
Peroxide of iron	5.646	11.700
Alumina	7.538	26.536
Phosphoric acid	0.082	0.134
Sulphuric acid	0.058	0.009
Water and organic matter	6.167	11.660
Total	99.436	100.175
Hygroscopic moisture	4.625	11.210
absorbed at	21.8 C.°	21.8 C.°

[The wide discrepancies between the older and later analyses, here given, leaves their general character somewhat in doubt. While the former are indefinite as regards the important elements, potash and phosphoric acid, they show a very high lime percentage, always indicative of great thriftiness in granitic soils. In this respect the North Carolina soil shows the exact reverse, viz, a deficiency of lime with fair percentages of potash and phosphoric acid in the subsoil, which would seem to indicate a rather unthrifty soil. The extraordinary amounts of iron and alumina dissolved in this subsoil render it worthy of further investigation as to the form in which the alumina exists.—E. W. H.]

The *hornblendic soils* are a variety of these red clay soils derived from granite and gneiss rock traversed by seams of hornblende. They are dark in color and of a more brilliant red. They occur in Edgfield, about Horns.

creek, and most extensively in Newberry, especially between the court-house and Ashford's ferry, extending thence into Fairfield. They form excellent cotton lands, and are well suited to the culture of all the grains. The following analyses of them are from Tuomey's *Geological Report*:

No. 32. *Red soil* from hornblende rock, Newberry county.

No. 33. *Red soil* from hornblende rocks, Monticello, Fairfield county.

Red hornblendic lands.

	NEWBERRY COUNTY.	FAIRFIELD COUNTY.
	Soil.	Soil.
	No. 32.	No. 33.
Insoluble matter	79.80	80.00
Potash and soda	0.06	0.30
Lime	0.04	1.00
Magnesia		0.50
Iron oxide	1.75	2.20
Alumina	5.20	6.30
Phosphoric acid		Trace.
Organic matter	6.20	7.00
Water and loss	7.45	2.70
Total	100.00	100.00

[The soil from Newberry county is probably very similar to soil No. 10 from North Carolina, in the preceding table, making allowance for the failure to determine the phosphoric acid in the older analysis. The Fairfield county soil, on the other hand, agrees more nearly with Nos. 29 to 31 in the large lime percentage.—E. W. H.]

The *mica slates*, where underlaid by, or alternate with gneiss, as in Abbeville, give rise to good soils. In most places, however, the slate contains lenticular quartz grains coated with mica, which being indestructible, occupy the surface as the rock disintegrates and give rise to poor soils.

Olay slate lands.

The sand of the talcose slate is "exceedingly fine and packs very closely". Says Lieber, in speaking of cleaning out a spring, "at a depth of 6 inches below the bed of the stream the sand was as dry as ashes, showing that the water had never penetrated to that depth, affording an explanation of the serious effects produced by drought in these parts."

Olay slates underlie a soil that is characterized as a cold gray soil, varying in color from gray to yellow and brown; the subsoil is for the most part of yellow clay, but sometimes it is reddish. These soils are better adapted for small grain, and more especially for oats than for cotton. They cover an extensive area in Edgefield county and reach along the northern border of the Tertiary, thence to Chesterfield. The clay slate soils in the last named county contain less silica than those of Edgefield; instead of being gray they are reddish, and are altogether better soils. The following analyses are given in Tuomey's report:

No. 34. *Soil* from Stevens creek, Edgefield county.

No. 35. *Soil* from near the Saluda, Lexington county.

No. 36. *Soil* from north of Columbia, Richland county.

Soils from clay slates.

	EDGEFIELD COUNTY.	LEXINGTON COUNTY.	RICHLAND COUNTY.
	Soil.	Soil.	Soil.
	No. 34.	No. 35.	No. 36.
Insoluble matter	80.72	76.30	80.80
Potash and soda	Trace.	0.40	0.30
Lime	Trace.	1.00	0.50
Magnesia	0.05	0.50	Trace.
Iron oxide	1.60	2.00	2.40
Alumina	12.00	10.40	9.00
Organic matter	2.40	6.70	5.60
Water and loss	3.23	2.70	1.90
Total	100.00	100.00	100.00

Trappean lands.

The trappean soils overlies extensive dikes of melaphyre and aphanitic porphyry traversing York and Chester counties in a northeasterly direction, coinciding very nearly with that of the Charlotte and Columbia railroad. They give rise to a distinctly-marked body of lands known as the "rolling black-jack lands" and as "black-jack flats". The latter are the most extensive and better defined in their characters. The lands are level, the streams slow and tortuous, with low banks, notwithstanding that the general elevation is little less than that of the surrounding country. The soil is of a rich dark-brown chocolate color, sometimes jet black; the subsoil, a yellow waxy clay, exceedingly tenacious, and where the rocks are not thoroughly decomposed it assumes an olive-green color. Beneath it the decomposed, and lower down the undecomposed rock is found, called here "iron rock" or "nigger head". The level configuration of the surface and the impervious nature of the subsoil interfere naturally with drainage, an interference, however, not at all beyond the remedy of art, as the fall is ample for properly constructed drains and outlets. But for this reason little attention has been bestowed upon these lands, which, from their general appearance and from the chemical analysis, would be ranked as among the very best in the state. Corn and cotton planted in them turns yellow—"parches," as it is termed. When, however, thorough drainage has been effected, and stable manure used, they have proved very productive and enduring. Such treatment is exceedingly circumscribed, the demand of the present system of agriculture being for light lands of easy tillage, whose defects of constitution may be at once supplied by the purchase of chemical fertilizers for the exigencies of the growing crop with no view to permanent improvement. The "rolling black-jack lands", as might be inferred from their name, have a better natural drainage, and have long been highly prized for their productiveness. The following analyses of these soils have been made for the Census Office.

No. 4. Soil from an inclosed black-jack flat, a short distance east of Chester Court-House, Chester county, and considered worthless; timber growth, forked-leaf black-jack and short-leaf pine; taken 12 inches deep.

No. 5. Soil from a cultivated field of J. B. Stokes, southeast of Chester Court-House, Chester county. The land is rolling, and had on it a crop of about 1,200 pounds of seed-cotton per acre.

Lands of black-jack flats (over trappean rocks), Chester county.

	Virgin soil.	Cultivated soil.
	No. 4.	No. 5.
Insoluble matter.....	80.840 } 89.454	83.145 } 86.780
Soluble silica	9.114 }	3.585 }
Potash.....	0.185	0.126
Soda.....	0.070	0.080
Lime.....	0.329	0.889
Magnesia.....	0.329	0.251
Brown oxide of manganese.....	0.210	0.185
Peroxide of iron.....	1.895	3.774
Alumina.....	4.622	4.045
Phosphoric acid.....	0.079	0.106
Sulphuric acid.....	0.150	0.170
Water and organic matter.....	2.068	4.185
Total.....	99.841	100.021
Hygroscopic moisture.....	3.967	8.392
absorbed at.....	27.9 C.°	27.9 C.°

[While the percentages of potash and phosphoric acid in these soils are not high, the presence of a relatively large amount of lime and, in No. 5 especially, of organic matter would render them fairly productive under good tillage and drainage, but probably potash would soon have to be supplied. The analyses do not seem to indicate a very large percentage of clay in these soils, and it is probable that marling or liming would promptly improve their tilling qualities.—E. W. H.]

The dioritic and feldspathic porphyries of Abbeville county produce a soil known as the "flatwoods", and are found in the townships of Calhoun's Mills, Magnolia, Abbeville, Ninety-six, and Smithville. They are said to have a warm deep brown color, and are very uniform in character. Formerly when more capital and skill were employed in agriculture, these lands were very highly esteemed, but since a cheap and easy, not to say thriftless, culture has superseded other husbandry they are neglected. Mr. Tuomey gives the following analyses of these soils in his survey report:

No. 37. Soil from a well-cultivated place north of Calhoun's Mills, Abbeville county.

No. 38. Soil from a cultivated field near Ninety-six, Abbeville county.

No. 39. Soil from abandoned lands in the meadow woods of Union county.

COTTON PRODUCTION IN SOUTH CAROLINA.

Cultivated lands of the flatwoods.

	ABBEVILLE COUNTY.		UNION COUNTY.
	Cultivated soil.		Abandoned land.
	No. 37.	No. 38.	No. 39.
Insoluble matter	52.00	48.30	58.00
Potash and soda	0.40	0.90	Trace.
Lime	2.50	4.00	1.80
Magnesia	Trace.	.....	0.50
Iron oxide	9.00	8.40	14.10
Alumina	22.10	19.36	19.30
Phosphate of lime .....	.....	0.10	.....
Organic matter	9.20	10.05	3.40
Water and loss	4.80	8.89	7.90
Total	100.00	100.00	100.00

[These soils differ strikingly from those of the preceding table, both in the large percentages of alkalies and lime and in the extraordinary amounts of alumina dissolved in analysis. Coupled with the large amount of organic matter, these characters constitute them a strict analogue of the prairies of the west. The deficiency in phosphates is probably only apparent and due to imperfect methods of determination. The high iron percentage would tend to render these soils very unsafe if not well drained, an improvement of which their durability would seem to render them well worthy. Deep and thorough tillage are pre-eminently necessary to render their cultivation profitable. The apparent increase in iron in the abandoned land is probably due to the removal of the surface soil, the sample representing a more highly ferruginous subsoil.—E. W. H.]

These analyses are indicative of the chemical changes that affect the productiveness of these soils. The abandoned field in Union shows a great falling off in organic matter, lime, and potash, due to insufficient drainage and a shallow culture.

The large amount of lime in all these trappean soils will be noted; it has induced some writers to classify them as calcareous soils, and adapts them peculiarly for the growth of pea-vines and clover, which thrive almost spontaneously upon them.

In addition to the soils above mentioned there is a large amount of bottom lands scattered along the numerous rivers, creeks, and branches that everywhere traverse this well-watered region. Though rarely of any great width, they are for the most part of great fertility and are highly valued. In some sections these lands have brought as high as \$100 an acre, the adjacent ridge lands being thrown in at a nominal price, just as the pine barrens are in the sales of the low country rice lands.

PRODUCTIONS.—The skins and furs of wild animals were the earliest productions which the upper country gave to commerce. About the middle of the eighteenth century the "cow-pen keepers" and the "cow-drivers", led thither by the representations of the trappers, hunters, and Indian traders, built their cabins among these pastures and made large inclosures, into which their numerous herds were driven for marking, handling, etc. The business was a large one, and numbers of neat-cattle were driven annually to the markets of Charleston, Philadelphia, and New York. Horse-raising also was largely engaged in, and so highly were the qualities of the Carolina horse of that early day esteemed that a statute of the provincial legislature forbids the introduction of the inferior horses of Virginia and of other northern plantations. Around the "cow-pens" of the stock-drivers the first agricultural settlers appeared. Their crops of wheat and Indian corn formed for many years a considerable item of export from the province. Hemp was largely cultivated, particularly between the Broad and the Saluda rivers, and De Brahm says it was the finest and most durable grown anywhere in the world for the cordage of vessels. The culture of tobacco was engaged in, but was restricted by the difficulty of bringing so bulky an article to market in the then condition of the country roads. It was packed in casks, trunnions fastened to each head, shafts attached, and drawn as a large roller by a horse several days' journey to market. Silk was grown and the vine successfully cultivated by the early settlers of New Bordeaux, in Abbeville district. It is noteworthy that within the last few years, since the French vineyards have suffered from the phylloxera, hundreds of thousands of cuttings of the Warren grape, native here, besides the seuppernong roots, have been ordered by grape-growers in France, and being planted there they have yielded a wine of excellent quality.

The lands produce fine crops of hay, nearly three tons of clover per acre or the same of Bermuda grass having been cut in one season. Taking the value of the lands into consideration, it is claimed that forage can be obtained here more cheaply than in the famous blue grass region of Kentucky. The cost of German millet is placed at \$6 per ton. Lucerne has long been established in this town, and there are stools of this valuable forage plant known to be fifty years old still in regions. In the same town one planter sowed in lucerne, in 1874, a half acre of red land, an old worn-out field infested with nut grass. In 1875 he got one cutting, and from that date to 1880 from 4 to 10 cuttings each year. The ten cuttings were obtained in 1878. The lucerne averaged 2½ feet in height at every

cutting, making a total growth for the season of 25 feet. By actual weighing each cutting averaged 4,189 pounds from this one-half acre, which was also carefully measured, giving a total of 20½ tons, or at the rate of 41 tons per acre. Since the invention of the cotton-gin the culture of cotton has so superseded all other agricultural pursuits that it might well be thought that nothing else could be grown here. Cotton planting has become so easy and simple, it requires so little individual thought and effort, the money returns are so certain and direct, or the crop may be so cheaply stored and preserved from injury for such an indefinite time, every business, trade, and industry accessory to the work of the farmer, from bankers and railroads to implement and fertilizer manufactures, have become so thoroughly systematized and organized in unison with this pursuit that any change is difficult, and, as a consequence, the other manifold resources of the country are neglected and undeveloped.

STATISTICS.—The metamorphic region embraces about 11,320 square miles, or over one-third of the entire state. The population numbers 395,043, the increase since the census of 1870 being 30 per cent. The density of population per square mile varies from 28 to 31 persons in Lancaster and Fairfield, and from 45 to 54 in Laurens and Greenville, the average being 31.4 per square mile, which makes it the most thickly peopled portion of the state, except the sea islands, which have 39.4 persons to the square mile. The percentage of colored population varies greatly in the different counties, being as high as 70 in Fairfield and as low as 34 in Spartanburgh; the average is 57 per cent. Of the 7,244,800 acres of land in this region 50 per cent. is in woodlands, 22 per cent. is in old fields, and 28 per cent. is tilled.

Farm-holdings.—There are 38,591 farms. This is an increase of at least 80 per cent. since 1870 and of 180 per cent. since 1860, while the increase in the decade preceding that, a time of much prosperity, did not much exceed 1 per cent. Fifty-six per cent. of the farms are worked by renters and 44 per cent. by owners. This is nearly 6 per cent. more of farms rented than in the state at large, or 10 per cent. more than in the other parts of the state. The maximum number of farms rented is 67 per cent. in Fairfield and the minimum is 42 per cent. in Laurens. Forty-five per cent. of the farms are under 50 acres, but 71 per cent. of the rented farms are under 50 acres, while only 13 per cent. of those worked by owners are under 50 acres. The farms under 50 acres worked by owners constitute only 6 per cent. of the total number of farms in this region; thus, notwithstanding the great subdivision of farm-holding that has been and still is taking place, it cannot be said that land is here in the hands of a small proprietary, as it is on some of the sea islands.

Tilled land.—The tilled land is 1,861,902 acres, an increase of 51 per cent. since 1870. This gives an average of 4.7 acres per capita, or nearly one acre above the average for the state and one-half more than in 1870. Of it 48 per cent. is in grain of all kinds, 40 per cent. is in cotton, and 12 per cent. is in other crops, gardens, orchards, fallows, etc. The proportion in cotton varies from a maximum of 50 per cent. in Laurens and Union to a minimum of 30 per cent. in Lancaster.

CROPS.—**Cotton.**—The production of cotton in 1879 was 274,318 bales against 93,494 in 1870, an increase of 193 per cent., or more than six times as great as that of the population within the same period. It constitutes 53 per cent. of the cotton crop of the state, or a little more than one-third of its area. The average number of bales per square mile is 24, and varies from 21 bales in Lancaster to 39 in Newberry county. In many of the townships the number of bales grown per square mile is much greater. In Fairfield county, township No. 3 produces 46 bales per square mile; in Newberry county, Floyd's township produces 47; in Chester county, Chester township produces 59; in York county, Fort Mill township produces 84. These facts indicate that the establishment of enlarged and improved gin houses for the better preparation of the staple is practicable in many places now, as they show that the main obstacle in the way of such establishment, the distance over which a sufficient quantity of seed-cotton would have to be hauled, is greatly lessening. The yield of lint cotton per acre varies from 200 pounds in Newberry to 152 pounds in Abbeville county, the average for the region being 166 pounds of lint per acre, which gives it rank as fifth in the state in point of production per acre. The yield of lint cotton per capita of population varies from 440 pounds in Fairfield to 216 pounds in Greenville; the average is 316 pounds, being less than in the red-hills region but more than it is elsewhere in the state.

Grain crop.—The grain crop is 7,731,528 bushels, an increase of 139 per cent. on the crop of 1870. The average yield for the whole region is 9 bushels per acre, and it varies from a maximum average of 13 bushels per acre in York to a minimum of 8 bushels in Laurens county, these variations depending more on the amount of attention bestowed on this class of crops than on differences in the productive capacity of the soil. The yield per capita of the population is 19 bushels, which is 4 bushels more than in 1870. If this were all corn or its equivalent, and were fed to the population at the rate of 10 bushels per capita yearly, and the work stock at the rate of 70 bushels a head, it would leave, counting nothing for the supply of other live stock, a deficiency of 1,091,000 bushels, or about 14 per cent. Estimated in the same manner, this deficiency was 31 per cent. in 1870. Compared with the other regions of the state, the yield per capita is below that of the sand hills, which is 32 bushels, and that of the Piedmont region, which is 20 bushels, but above that of each of the four others.

Work stock.—The work stock is one to every 27 acres of tilled land, the average for the whole state being 1 to 25. More land is tilled here to the head of work stock than elsewhere in the state, except in the red-hill region. As the lands themselves are not lighter or of easier tillage, this is chiefly due to a more economical use of this power.

The live stock number 473,180. This gives 42 to the square mile against an average for the state of 36. Although this region ranks third in its proportion of live stock to area, it was here that the first movements in favor of the

law requiring the inclosing of stock took place. It is also noteworthy that the counties here in which the inclosure of stock has been enforced by law for a few years support 50 head of live stock to the square mile, while the four counties in which the stock have enjoyed the freedom of ranging wherever they could support only 36 head to the square mile.

Farm values and productions.—The total of values invested in farms in this region (obtained as the sum of the values entered in the Tenth United States Census for lands and improvements, for farm implements and machinery, and for live stock), amounts to \$39,000,000, which does not differ very widely from the valuation of the same property on the tax returns of these counties. The value of farm productions annually is \$19,250,000, or 49 per cent. on the above investment. This percentage varies in the different counties from 39 per cent. in Greenville to 71 per cent. in Laurens. It may not be possible to ascertain, even approximately, how the profits of this production are distributed, how much of it rests with the farmer and laborer, and how much goes to merchants, bankers, and railroads. Nevertheless, whoever gets the net profits, it is safe to assume that these values represent in a general way the productiveness of agriculture in this region. (a) Here are twelve adjacent counties, between whose soil, climate, population, social, political, and industrial system there is very great similarity. On the other hand, there are very wide variations among these same counties on four points frequently and earnestly discussed as affecting fundamentally southern agriculture. These are—

1. The ratio between the area planted in cotton and that planted in other crops.
2. The ratio of large and small farm-holdings.
3. The proportion of farms rented to those worked by their owners.
4. The proportion of the white to the colored population.

The following table will show the relations of these counties in these four respects to the percentage of farm production on farm values in each:

Names of counties.	Percentage of tilled land in cotton.	Percentage of farms of 50 acres and over.	Percentage of farms rented.	Percentage of colored population.	Percentage of value of farm productions on farm values.
Newberry	45	57	56	68	49
Lancaster	31	49	56	52	60
York	37	64	45	54	46
Laurens	50	82	41	60	57
Spartanburgh	41	54	51	34	41
Edgefield	40	47	57	65	49
Chester	44	57	60	68	54
Greenville	35	47	53	38	38
Union	50	46	66	56	50
Fairfield	40	45	67	75	60
Anderson	38	59	55	44	45
Abbeville	40	52	60	68	49

Considered wholly within the limits of the above data, and bearing in mind that they can give only a bare approximation to the truth, Professor B. Sloan, of the University of South Carolina, states the arithmetical conclusions to be obtained from this table as follows:

	Per cent.
An increase of 10 per cent. of the tilled land in cotton increases the values produced by	7½
An increase of 10 per cent. of farms over 50 acres increases the values produced by	5
An increase of 10 per cent. of farms rented increases the values produced by	½
An increase of 10 per cent. of colored population increases the values produced by	3½

Such conclusions are liable to material modifications when viewed in relation with the numerous conditions that complicate such a problem. For instance, the increase in the colored population does not necessarily show that the proportion of colored farm laborers is increased in the same ratio. Nevertheless, if these facts only show in which direction the answer lies, it follows that these answers are opposed to the generally received teachings and theories on these points; (b) and at the same time that these answers are in accord with the persistent and prevailing practice of those whose decision is paramount in the matter, viz, the land owners and the laborers.

a It must not be forgotten that in the above estimate of profits and investments, the assessed values for purposes of taxation are taken as a basis. It is well understood that these values are far below the actual market value of the properties in ordinary business transactions, and represent more nearly the minimum that might be realized at forced sales.—E. W. H.

b Since the year 1808, the teachings and theories regarding agriculture in South Carolina (as expressed in agricultural periodicals, in the proceedings of agricultural societies, and in the addresses and essays of planters) were:

1. That a decrease of the area of tilled land in cotton will add to the value of farm productions. (Here this does not seem to be the case, from the fact that 10 per cent. more cotton increases the value 7½ per cent.)
2. The farms should be small. (Here large farms appear to do better.)
3. The negro is indispensable to the production of cotton. (Here the crop does not appear to increase *pari passu* with the increase of negro population.)
4. The prevailing practice in the state should be to rent lands. (Here it appears that the increase of rented farms does not increase production.)

THE PIEDMONT REGION.

The Piedmont region of South Carolina occupies the extreme northwestern border of the state. Commencing at King's mountain, in York county, it extends westward through Spartanburgh, Greenville, Pickens, and Oconee counties, widening in the three last named until it embraces a tier of the most northern townships, two to three deep. This wedged-shaped area has a length of 114 miles, and a width varying from 8 to 21 miles.

The surface of this region presents a rolling table-land, broken and hilly on the margin of the streams, but scarcely anywhere inaccessible to the plow. It has a general elevation above the sea-level of 1,000 to 1,500 feet. This gently undulating surface extends to the mountains, whose rocky walls often rise suddenly to their greatest height; the southeastern face of King's mountain rises perpendicularly 500 feet above the plain, and its northwestern slope descends gently toward the Blue Ridge mountains. Table Rock also rises 800 feet vertically, or a little overhanging, above the southeastern terrace at its base, which is formed of the loose fragments that in the course of ages have fallen from above. The steep ascent of these mountains from their South Carolina or southeastern face, and their gradual slope to the northwest, where the mountains of North Carolina rise apparently from a level country, is the reverse of the prevailing rule on the Atlantic slope, which is, that the short, steep sides face northwest, and the long gentle slopes face southeast. Lieber thinks that these mountain cliffs indicate the occurrence here, in the remote past, of a great fissure or crevasse in the earth's crust, a gigantic fault, when the southern slopes fell down hundreds of feet, and exposed the precipitous rock walls that now face the southeast.

The boundary line of South Carolina reaches the most easterly chain of the Appalachian mountains, known here as the Saluda mountains, near the corner of Greenville and Spartanburgh counties, and follows the summit of the ridge for 50 miles (30 miles in an air line) until it intersects the old Cherokee Indian boundary line. From this point the mountain chain, here called the Blue Ridge, turning slightly to the north passes out of the State, and the boundary line pursues a more southerly and straight course, to where the east branch of the Chattooga river intersects the thirty-fifth degree of north latitude. The Chattooga flowing westward to its junction with the Tugaloo river, which in turn becomes the Savannah river, flowing to the southeast, is the northwestern and the Savannah the western boundary of the state. The mountain chain divides the waters of the state flowing to the Atlantic ocean from those flowing northward, which eventually finds issuance to the southwest through the Tennessee and Mississippi rivers into the Gulf of Mexico. Considering the water-shed of South Carolina alone, the culminating point whence the rivers of this section flow is to be found in the horseshoe curve of the mountain chain north of the straight boundary line referred to as uniting the Chattooga and the Blue Ridge. Hence the numerous sources of the Keowee river, White water, Toxaway, Jocassee and other creeks, take their rise and flow nearly due south; the main stream of the Saluda sweeps away to the east, and the Chattooga hurries westward.

It was from a noted summit of this range, Whitesides, that Mr. James E. Calhoun observed as early as 1825 that the "character of the mountains change from an unbroken chain to isolated masses toward the south". Such isolated masses form a striking feature of the mountains of South Carolina, and they make their appearance over a wide area of the state, extending west and east from Stumphouse mountains, near Walhalla, in Oconee county, to past Paris mountain in Greenville, Gilkis mountain in Union to King's mountain and Henry's Knob in York; southward they reach to Bird's mountain in Laurens, Parson's mountain in Abbeville, and Ruff's mountain on the Newberry and Lexington line. The narrow mountain ridge that divides the river system of the Mississippi from that of the Atlantic slope, and, as it were, the interdigitation, of the sources of the Hiawassee and the Tennessee with those of the Savannah, have long suggested to engineers the possibility of establishing an interflow between these waters. A canal, Mr. Calhoun says, across Rabun gap, would pour 35 miles of smooth water from the Little Tennessee into the Tugaloo river, while the Chattooga, the Hiawassee, the Tomro, and the innumerable mountain streams of this well-watered region, would serve as feeders to maintain the water supply in any desired quantity. In 1873 water was drawn from Black creek, an affluent of the Tennessee, across this gap to Iyell's mills on Chicken creek, an affluent of the Savannah.

The elevations above the mean level of the sea of the following points in northwestern South Carolina, were determined by the United States Coast and Geodetic Survey: King's mountain, 1,692 feet; Paris mountain, near Greenville, 2,054 feet; Cæsar's head, 3,118 feet; mount Pinnacle, near Pickens (the highest point in South Carolina), 3,436 feet.

The bracing and healthy climate of this region, its beautiful scenery, the bold mountain outlines, the rich luxuriance of every growth, no stunted plant on mountain side or summit, every part, even the crevasses of the rocks covered with trees and shrubs of some kind, all full of life and vigor, the clear, swift streams that everywhere leap in a succession of cascades from crag and cliff and sparkle in their course along the narrow but fertile valleys, have made it for generations a resort for health and for pleasure during summer.

GEOLOGY.—The geological features of this region are very similar to those of the one lying immediately south of it. The prevailing rock is gneiss, sometimes changing into granite of good building qualities, and sometimes slaty, furnishing superior flagging-stones, a remarkable locality of which occurs 8 miles south of Pickens Court-House on the Greenville road. For the most part the rock is found at a depth of from 30 to 50 feet beneath the surface

in a state of greater or less decomposition. Above the gneiss, whose outcrops are much confined to the beds of streams, islands of mica slate, occupying the more elevated lands, are found. The largest of these isolated bodies extends for a considerable width along the ridges above the Chattooga river. The proportion of mica slate is greater here than elsewhere in the state. Between it and the gneiss, and cropping out almost everywhere around the edges of the first-named rock, are extensive seams of hornblende rock, and its decomposition adds largely to the fertility, especially of the creek and river bottoms of this section. Above the mica slate, in the large body of rock on the Chattooga, some talc slate is found. This underlies a considerable area of itacolumitic sandstones, that in turn support several bodies of limestone rock. A number of lime kilns have been in operation here.

Of the useful ores and minerals of this section it may be stated that there are numerous gold deposits, at some of which washings have been carried on with much profit. Vein mining, in spite of many promising indications, has not been regularly undertaken.

Indian and revolutionary traditions tell of lead mines, which in former times furnished belligerents with an ample supply of this necessary metal. Unfortunately these traditions have not preserved the knowledge of their locality. At the Cheochee gold deposit mine on the headwaters of Little river, in Oconee county, Lieber examined a very promising vein of argentiferous galena which he thought might be profitably developed. Traces of copper were observed by Lieber on Tiger river, in Spartanburgh, near the galena mine above mentioned, and in some mill runs in southern Pickens and Greenville. Graphite is found on Paris mountain, and also in Oconee county. Manganese and iron occur, but have not been explored. Valuable soap-stone quarries have been worked to a limited extent in Pickens. Large sheets of transparent mica have been found near Walhalla, and asbestos of good quality is reported as occurring near Seneca city.

TIMBER GROWTH.—The prevailing growth is oak, chestnut, and short-leaf pine. Proceeding toward the mountains, the following trees mark the ascent in the order here named: Rock chestnut oak (*Quercus prinus monticola*), cucumber tree (*Magnolia acuminata*), mountain laurel (*Rhododendron maximum*), white pine (*Pinus strobus*), hemlock or spruce pine (*Abies Canadensis*). The forest products are shingles, tan-bark, and dogwood, with other hard woods, besides abundant timber for building purposes. The Indians once gained their chief livelihood here by gathering and disposing of medicinal herbs, such as pink root (*Spigelia Marylandica*), ginseng, and snake root, which are to be found in great abundance.

CLIMATE.—According to the physical charts of the Ninth United States Census and the rain charts of the Smithsonian Institute, second edition, 1877, this region has a mean annual temperature corresponding with that of Kansas or of New Jersey. The more mountainous portions have, however, a mean annual temperature that corresponds with that of Montana or the lower region of the great lakes. The mean of the hottest week of 1872, taken at 4^h 35^m p. m., was 90° F. The mean of the coldest week of 1872 and 1873, taken at 7^h 35^m a. m., was 25° F.

The prevailing winds are from the southeast, and the mean velocity of the movement of the atmosphere is much below the average for the United States at large. In the frequency with which this region is traversed by storm areas of about 50 miles in diameter, it ranks with the lowest in the United States. With the more extensive region south of it, it is peculiarly exempt from destructive storms.

Blessed with an unusual number of clear days and a large amount of sunshine the fig tree thrives here without protection at an elevation of 1,500 feet above the sea. "The climate is less subject to sudden changes than in the plain below. Vegetation is late, but when once fairly begun is seldom destroyed by subsequent frosts. Neither are there any marks of trees being struck by lightning, or blown up by storms."—(*David Ramsey, History South Carolina.*)

The annual fall of water is over 60 inches, which places this among the regions of heaviest precipitation in the United States. For spring it is over 18 inches, and for autumn it is 12 inches, which are also the maxima in the eastern United States. In winter the rainfall is 16 inches, which is less than the maximum, and in summer it is 14 inches, which places it third in a series of five, or just medium. Dewless nights rarely occur, and the luxuriant vegetation of this region does not in consequence suffer from the rigor of extreme droughts so frequent elsewhere.

The following observations on the temperature of springs in this region were made by Lieber:

Locality.	Time of observation.	TEMPERATURE.	
		Atmosphere.	Water.
Poinsett's spring, in Greenville, near the North Carolina line.	June 7, 7½ a. m.	72.05	56.86
Spring on Jones' Gap road, near turn-pike gate.	June 16, 2 p. m.	75.74	57.56
Cold spring on Cæsar's head	June 20, 9½ a. m.	80.60	55.40
House spring, Cæsar's head	June 20, 10½ a. m.	78.80	57.56

AGRICULTURAL FEATURES.—The soils are similar to those found elsewhere in the metamorphic region where gneiss rock prevails. On the more level uplands a gray sandy loam predominates; a red and sometimes yellowish soil with white clay on the mica slates, and a stiff red clay on the hillsides. In the bottoms a still darker and more

fertile loam is found. These bottom lands have long been highly esteemed as yielding abundant crops of corn, the small grains and the grasses. Little thought or attention was bestowed on the uplands previous to the attempts, so successfully made within the last few years, to introduce upon them the culture of cotton.

STATISTICS.—The Piedmont region of South Carolina embraces an area of 1,250 square miles, and is therefore the smallest division of the state here treated of. The population numbers 34,496, an increase of 66 per cent. since the census of 1870; this gives the density of population as 27 per square mile, which is below the average of the state and less than in other regions, the sand hills and the lower pine belt alone excepted. Twenty-six per cent. of the population is colored.

Eighty per cent. of the land is woodland and forest; 17 per cent. is tilled, and 3 per cent. is in old fields. The area of tilled land has more than doubled since 1870, being now 132,791 acres, and then only 64,802 acres. This is 3.8 acres per capita of population against 3.1 acres in 1870, showing that improvement has more than kept pace with the increase of the population.

The number of farms is 4,646, which gives an average of 28 acres of improved land to the farm. Of this number 43 per cent. are under 50 acres, and may be considered as in the hands of small farmers. Nevertheless there are some large landholders in this region. Of the farms, 45 per cent. are rented, and of these 74 per cent. are under 50 acres, showing that the renters are farmers on a small scale. Of the 55 per cent. worked by their owners only 15 per cent. are under 50 acres. Of *bona fide* small proprietors (if landholders of under 50 acres who till their own land may be termed such) the number is small, being only 7 per cent. of the total number of farm-holders. By far the larger number of farms are rented for a portion of the crop, very few being rented at a fixed money rental; for instance, in five adjacent townships in Greenville, where there are 631 farms rented, only one is reported as rented at a fixed money rental.

Of the tilled land, 88,766 acres, or 65 per cent., is in grain of all kinds; 25,740 acres, or 20 per cent., is in cotton; and 18,285 acres, or 15 per cent., in fallow and all other crops, including gardens, orchards, and vineyards, and a small area in tobacco.

The average yield of grain is only a little over 8 bushels to the acre, and does not express the capability of this section for the production of this article. Fields of corn on bottom lands averaging from 40 to 60 bushels are not uncommon, and the minimum calculation of the crop for uplands without manure is from 10 to 12 bushels per acre, while from 20 to 30 bushels are obtained by good culture. Rice has given here, without manure, over 100 bushels to the acre, though very little of it is planted. The yield of grain per capita is 20 bushels, and is greater than elsewhere in the state, except in the sand-hills regions.

The average product of cotton to the square mile is 6.3 bales, an increase of over 600 per cent. since 1870. This is more than upon the coast, in the lower pine belt, and in the sand-hills region, but much less than elsewhere in the state. The average yield of lint per acre planted in cotton is 141 pounds, which is 53 per cent. more than the yield on the coast, but less than elsewhere in the state. The product per capita is 105 pounds of lint against 14 pounds in 1870. This is 150 per cent. more than the product on the coast, and 54 per cent. more than in the extensive lower pine belt. Still, it is not one-half of product in the remainder of the state.

The work stock number 5,798 against 4,096 in 1870. This is 4.6 to the square mile, the average for the state being 5. The ratio of work stock to the population is less than elsewhere in the upper country, but more than in the regions below the red hills. There are 22 acres of tilled land to the head of work stock, which is more than elsewhere in the state, except in the red hills and the metamorphic region.

Other live stock numbers 66,035, being more per square mile than elsewhere in the state, and more per capita of the population, except only among the sand hills.

Analyses of soils and subsoils of South Carolina.

[Made for the Census Office.]

Number.	Name.	Locality.	County.	Vegetation.	Depth. Inches.	Insoluble matter.	Soluble silica.	Total insoluble matter and silica.	Potash.	Soda.	lime.	Magnesia.	Brown oxide of man- guese.	Peroxide of iron.	Alumina.	Phosphoric acid.	Sulphuric acid.	Water and organic matter.	Total.	Hygroscopic moisture.	Temperature of ab- sorption, C.°.	Analyst.
COAST REGION.																						
6	Sandy soil.	Northeast end of James island.	Charleston.	.....	12	89.3632.	0.6291.	430.0.	0.131.	0.077.	0.038.	0.154.	0.077.	0.598.	2.845.	0.206.	0.154.	4.789.	100.489.	4.120.	25.0.	J. B. Durrett.
UPPER PINE BELT.																						
3	Sandy cultivated soil.	Near Bennettsville.	Marlborough.	Originally long-leaf pine, un- dergrowth of oak and dog- wood.	12	96.000.	0.950.	96.950.	0.040.	0.027.	0.052.	0.060.	0.023.	0.564.	0.441.	0.064.	0.063.	1.561.	99.845.	1.441.	28.0.	Chappell Cory.
7	Sandy mulatto cultivated soil.	Near Court-House.	Barnwell.	Originally long-leaf pine and undergrowth of hickory and oak.	12	91.230.	2.489.	93.719.	0.092.	0.047.	0.091.	0.046.	0.105.	0.760.	2.430.	0.159.	0.100.	3.091.	100.700.	2.245.	28.0.	J. B. Durrett.
8	Sandy cultivated soil.	Near Savannah river, from plantation of P. F. Ham- mond.	Aiken.	Originally long-leaf pine, un- dergrowth of post and black-jack oaks.	12	93.035.	1.483.	95.178.	0.076.	0.060.	0.114.	0.202.	0.020.	0.737.	1.840.	0.036.	0.106.	1.771.	100.146.	2.512.	14.5.	G. E. Colby.
9	Sandy virgin soil.	Red clay ridge, near Marl- borough line.	Marion.	Hickory, oak, and pine.	12	84.754.	4.435.	89.189.	0.192.	0.080.	0.068.	0.294.	0.036.	1.997.	4.854.	0.022.	0.236.	3.312.	100.269.	4.518.	14.5.	Do.
RED HILLS REGION.																						
1	Virgin red-land soil.	3 miles below junction of Wateree and Congaree rivers.	Orangeburgh.	Red oak, hickory, dogwood, and short-leaf pine.	12	88.060.	3.055.	92.065.	0.115.	0.050.	0.062.	0.028.	0.098.	1.250.	3.979.	0.096.	0.047.	2.621.	100.361.	1.982.	26.6.	J. B. Durrett.
2	Virgin redland, cultivated 100 years.	do.	do.	do.	.....	89.340.	2.847.	92.187.	0.136.	0.063.	0.077.	0.061.	0.096.	1.559.	3.666.	0.087.	0.038.	1.668.	99.640.	1.444.	26.6.	Do.
METAMORPHIC REGION.																						
<i>Red clay lands.</i>																						
10	Yellowish-red soil.	Near Spartanburgh, N. C.	Spartanburgh.	Post, white and black oaks, short-leaf pine and hickory.	5	77.800.	1.790.	79.650.	0.092.	0.041.	0.036.	0.070.	0.056.	5.646.	7.538.	0.082.	0.058.	6.167.	98.496.	4.685.	21.8.	C. Cory.
11	Red clay subsoil.	do.	do.	do.	5-20	46.740.	5.870.	49.610.	0.214.	0.037.	0.003.	0.212.	0.010.	11.700.	26.536.	0.134.	0.009.	11.666.	100.175.	11.219.	21.8.	Do.
<i>Clay, slate, or black-jack fawnwood lands.</i>																						
4	Black-jack flat soil.	Near Chester Court-House.	Chester.	Black-jack oak and short- leaf pine.	12	80.340.	0.114.	89.454.	0.135.	0.070.	0.329.	0.329.	0.210.	1.895.	4.622.	0.079.	0.150.	2.068.	99.341.	3.967.	27.9.	J. B. Durrett.
5	Cultivated soil.	do.	do.	do.	.....	83.1463.	535.	86.730.	0.126.	0.060.	0.389.	0.251.	0.185.	3.774.	4.045.	0.106.	0.170.	4.185.	100.021.	8.392.	27.9.	Do.

CULTURAL AND ECONOMIC DETAILS
OF
COTTON PRODUCTION.

REFERENCE LIST
OF
NAMES AND ADDRESSES OF CORRESPONDENTS.

COAST REGION.

CHARLESTON.—A. B. ROSE, Charleston, February 16, 1880; W. G. HINSON, James island, February 16, 1880; ELIAS S. RIVERS, James island, February 16, 1880; W. EDINGS FRIPP, John's island, June 30, 1880; J. JENKINS MIKELL, Edisto island, June 14, 1880.

LOWER PINE BELT.

HAMPTON.—HOMER H. PEEPLES, Peebles, June 28, 1880.

COLLETON.—JAMES W. GRAW, Walterboro', January 18, 1880; G. VARN, Folk's Store, August 18, 1880.

WILLIAMSBURGH.—JAMES M'CUTCHEEN, Kingstree, March 26, 1880; W. H. B. TAYLOR, Black Mingo, June 22, 1880.

CLARENDON.—M. M. BENBOW, Wright's Bluff, March 12, 1880.

HORRY.—THOMAS W. BEATY, Conwayboro', July 20, 1880.

UPPER PINE BELT.

AIKEN.—P. F. HAMMOND, Beech Island, May 9, 1880.

BARNWELL.—JOHNSON HAGOOD, Columbia; JAMES C. BROWN, Millett, January 8, 1880; JOHN S. STONEY, Allendale; WILLIAM B. RICE, Bamberg.

RICHLAND.—THOMAS W. TAYLOR, Columbia.

ORANGEBURGH.—O. N. BOWMAN, Rowesville, June 5, 1880.

KERSHAW.—W. M. SHANNAN, Camden, June 21, 1880.

DARLINGTON.—J. J. LUCAS, Society Hill, March 13, 1880; ED. E. EVANS, Society Hill.

CHESTERFIELD.—HENRY P. DUVALL, Cheraw, June 24, 1880.

MARLBOROUGH.—C. S. MCCALL, Bennettsville, September 4, 1880; E. T. STACKHOUSE, Little Rock, April 13, 1880.

MARION.—W. D. JOHNSON, Marion Court-House, August 28, 1880.

RED-HILL REGION.

AIKEN.—T. W. WHATLEY, Aiken Court-House, July 17, 1880.

ORANGEBURGH.—J. E. KNOTTS, Knotts' Mills, March 1, 1880.

SAND-HILL REGION.

CHESTERFIELD.—S. G. GODFREY, Cheraw, January 2, 1880.

METAMORPHIC REGION.

LAURENS.—JOSEPH B. HUMBERT, Tumbling Shoals, June 14, 1880; G. W. SULLIVAN, Tumbling Shoals, December 25, 1879.

CHESTER.—JOHN C. FLENNIKEN, Chester Court-House, June 18, 1880; J. M. IVY, Rock Hill, July 2, 1880.

ABBEVILLE.—W. K. BRADLEY, Long Cane, August 16, 1880.

GREENVILLE.—W. L. DONALDSON, Greenville, January 15, 1880.

FAIRFIELD.—G. H. MCMASTER, Winnsboro', June 10, 1880; JAMES PAGAN, Winnsboro', March 9, 1880.

NEWBERRY.—MILTON A. CARLISLE, Newberry.

SPARTANBURGH.—S. C. MEANS, Spartanburgh, March 13, 1880.

YORK.—IREDELL JONES, Rock Hill, February 8, 1880.

LEXINGTON.—F. J. HARMAN, Lexington Court-House, July 27, 1880; J. A. SOMMER, Pemaria, April 6, 1880.

PIEDMONT REGION.

OCONEE.—A. R. BROYLES, Townville, May 1, 1880; L. B. JOHNSON, Walhalla, January 1, 1880.

PICKENS.—S. W. CLAYTON, Central, June 1, 1880.

CULTURAL AND ECONOMIC DETAILS.

[Compiled in part from schedules of questions on cotton culture as answered by correspondents in the various counties.]

TILLAGE, IMPROVEMENTS, ETC.

COAST REGION.—The sea islands have enjoyed since 1866 the advantages of a law special to their locality requiring the owners of stock to keep them inclosed. Owing to this and to the numerous creeks and marshes that intersect these islands and which serve as natural divisions between the different fields when required, fences are not a burden on the agriculture of the coast lands, and there is comparatively little fencing.

Drainage, although said by Governor Seabrook to be so little attended to on the sea islands as to be scarcely worthy of being considered a regular agricultural operation, has of necessity always been practiced to some extent. The remarkably high beds on which cotton is planted here, being from 18 inches to 2 feet high, subserve this purpose. The best planters have long had open drains through their fields. These were generally made by running two furrows with a plow and afterwards hauling out the loose dirt with a hoe, thus leaving an open ditch, if it may be so termed, a foot or more in depth. In recent years the enterprising farmers on James island have made deeper ditches and placed plank drains in them. Seeing the great benefit resulting from this, they subsequently replaced the plank with regular drainage tile. In this way they have reclaimed a good deal of land, besides adding largely to the value of that already in cultivation. The outlets open to the sea at the low-water mark, and the pressure of the water in the pipes preserves a constant outflow even at high tide, so that land only a foot or two above high-water mark is susceptible of thorough drainage to the depth of 4 or even 5 feet. The borders of these islands being usually their highest parts, and their interior often quite low, a wide field for improvement is offered in this direction. In the early part of the century, when agriculture had so far developed the value of these lands as to make \$60 an acre for planting land not an unusual price, the use of the plow was entirely unknown here, and all the operations of tillage were performed by hand with the hoe alone. This continued to be the usual practice until the war. Since then plows have come more and more into use, until their employment is now quite general.

Fallowing is practiced to the extent that land planted in cotton one year is pastured by cattle and sheep, not hogs. It is claimed that great benefit is derived by having the loose soil of the islands trodden by stock during the year they lie fallow. The rapid growth of bushes, briars, and weeds is kept down by the stock, and the dried stems of the cotton stalks of the previous year are broken up and tramped down. If care be taken "that the grass is not eaten so close as to expose the soil on the tops of the beds to the summer sun", it is found when the stock are turned off in November to range through the fields that the pasture "is in exactly the right condition for the coming season's cotton fields, with no cotton stalks or troublesome growth to be got off or under the land and make it too husky". About one-half of the land formerly cultivated is reported as "turned out" on John's island, and the same or a larger proportion on Wadmalaw. On the other islands less land has passed out of cultivation, but nowhere has the acreage under cultivation increased.

LOWER PINE BELT.—In Colleton county one-quarter to one-half of the swamp lands are reported as thrown out of cultivation, but none of the lighter uplands; in Williamsburgh from 10 to 30 per cent. In Clarendon at least one-third of the cultivated lands have been turned out since the war; in Horry very little. These lands all produce as well as virgin soil when reclaimed and again brought under cultivation.

The depth of plowing is usually 4 inches with a single-horse plow; sometimes a double-horse plow is used, and a depth of from 6 to 7 inches attained.

Subsoiling is little practiced. Fall plowing is especially adapted to these light soils that are not run together and packed by the winter rains, and is not generally practiced, only because the weak force on the farms are scarcely ever sufficiently up with the work to afford the time.

Fallowing is only practiced to the extent of letting fields lie idle during summer, which it is found greatly benefits them.

A rotation of crops is attempted so far as the exigencies of the cotton crop allow, by following cotton with corn, and that in the same year with oats, sowing pease on the stubble and following with cotton again the next spring.

Home-made manures are used so far as they go, with excellent results. Composts of muck and stable manures are coming more into use, and the field pea, either turned under green or allowed to wither on the surface, adds largely to the fertility; and by these means almost any of the uplands are made to produce a bale of cotton to the acre. The limited means at the disposal of the farmers in these respects, in a section where little attention is paid to corn and cattle, is largely supplemented by the purchase of commercial fertilizers, especially the Charleston phosphates. In Clarendon these are used almost exclusively, but in Colleton they are coming somewhat into disfavor, and the preference is given to the potash salts. Cottonseed, which was once thought to be only valuable as a manure for corn, is now applied with great benefit to cotton, and with the exception of a very small amount fed to stock, it is all employed in this manner; selling at from 10 to 15 cents a bushel.

UPPER PINE BELT.—Inclosures, under the colonial laws, that have not been changed, are required to be cattle proof. The fences are built of pine rails 10 feet in length, running about 100 to the cord, worth usually 50 cents a cord, and are split for 50 cents per hundred, making the cost \$1 per hundred in the woods. Fourteen rails make eight feet in length of worm fence, or 9,240 rails per mile, lasting on an average five years. A recent act of the legislature allows each township to determine by vote whether the crops or the stock shall be inclosed; if the latter, the township to tax itself for the fences necessary to protect it from the stock of the adjoining townships. To this date few townships in this belt have availed themselves of this law.

Drainage is little practiced in this region, the culture of the swamps being generally abandoned, and the uplands being thought not to require it. In Marlborough and Marion, however, great benefit results from a system of open ditches very generally adopted (see regional description). Little or nothing is required in the way of hillside ditches on these comparatively level lands, where little injury is experienced from washing.

The former practice of allowing fields to lie fallow, for the benefit of the growth of weeds, which increased the vegetable matter in the soil, and which killed by their shade the grasses that were especially troublesome on cultivated lands, has been almost wholly abandoned.

Nor is there any regular or general system of rotation of crops. Cotton lands especially are planted year after year in the same crop, and if properly manured are thought to improve. Rotation, when practiced, is two years in cotton and one year in corn; small grain is planted in the fall after the corn is gathered, and the next summer a crop of corn or cow-pease is grown on the stubble, to be followed the next spring by cotton. In Marlborough county lands planted in cotton for fourteen successive years, without additional manure except the cottonseed from the larger crops, produce double what they did at first.

The fall plowing of cotton and corn lands, once much practiced, has been very generally abandoned; some still think it pays to break the land 8 or 10 inches deep in the fall about every fourth year, otherwise it is only done to turn under weeds on land that has been resting.

The depth of tillage varies from 2½ to 6 inches measured on the land side of the furrow, and it is very rare to see more than one animal used in plowing. It is only the larger farmers (who are becoming scarcer) who use two-horse plows occasionally.

The amount of land once cultivated that has been abandoned is stated to be very little in Hampton county; from 10 to 20 per cent. in Barnwell; 10 to 15 per cent. in Orangeburgh; 25 per cent. in Darlington, and, excluding swamps, nothing in Marion and Marlborough. When the uplands are turned out in this region, they grow up first in broom-sedge, which is succeeded by short-leaf pine, beneath which, in time, all grass and undergrowth disappears. When again taken in, they yield well with manuring, but without good treatment they deteriorate more rapidly than virgin soil. (It is a question, on which there is a diversity of opinion, whether the second growth of pines is a benefit or an injury to land; in the lower country it is thought to be injurious, supporting the view that narrow-leaved growths do not improve the soil. In the upper country the opinion is, however, decided that the soil improves under the old field-pine. With some other growths there is no question in this regard; for instance, the persimmon always improves lands, and seems to exert no bad influence even on the growing crops in cultivated fields, it being often remarked that the tallest cotton is found under such trees, while it is dwarfed by the proximity of a pine or a post oak. Certain other forest trees seem to favor particular growths here, as the sugar-berry, under which verdant patches of blue grass are often seen when found nowhere else.)

Green manuring, especially with the cow-pea, is regarded favorably, although it is not practiced as a system. Sown broadcast, manured with the "ash element" (a cheap fertilizer composed chiefly of lime and potash) and turned under after the vines are wilted by frost, remarkable results have been attained. Colonel Thomas Taylor says that lands subject to rust, and never yielding more than 7 bushels of wheat, have given 26 bushels under this treatment. After the cotton is laid by, a furrow is sometimes run in the alley, and cow-pease are drilled in, forming the basis on which the next year's cotton bed is to be constructed. Pease grown among corn are esteemed highly for the beneficial influence they exert on the soil, as well as for the crop they yield.

The limited amount of stable and lot manure, furnished chiefly by the work stock, other cattle being rarely fed or penned systematically, is much valued.

Cottonseed is wholly used for manure, either alone or composted with woods-mold and litter, or the superphosphates, and its use has much increased. These means of maintaining the fertility of the land are largely supplemented by the use of guanos and other fertilizers. In Marlborough county the general rule is to return to the

land all the cottonseed produced on it, and in addition one sack of Guanappe guano, or half a sack of it, with 100 pounds of superphosphates, and if rust is apprehended 100 pounds of kainit. Lands so treated are counted on with much certainty to give a bale of cotton to the acre one year with another. This may be taken as the best established and most successful practice regarding manures. There are wide variations from it. A very few, but not the least successful farmers, purchase no commercial fertilizers, and rely wholly on cottonseed, composts of woods-mold and leaves, and stable manure. The use of fertilizers is very generally deprecated as unthrifty and extravagant, but the facility with which they may be obtained and used makes their employment the general practice.

RED-HILLS REGION.—Fencing to protect growing crops from the depredations of cattle running at large is now a heavy burden on the agriculture of this region. But public opinion is advancing so rapidly against the existing laws on this subject, especially in the upper country, that the present laws probably will be repealed. And while the right of pasturage in common on uninclosed and waste lands will be maintained, it will not be required to protect growing crops against cattle at large.

Drainage on these high lands is not practiced except occasionally where hillside ditches are required to protect very rapid slopes from washing.

Fallowing was formerly practiced in so far that a portion of each plantation "rested", that is, lay uncultivated every second or third year. Such practice now is the result rather of accident than of any settled economy of the farm, though it is still believed that land allowed to grow up in weeds or sowed in pease to be turned under is greatly benefited thereby.

The rotation of crops is also almost entirely neglected. Whenever and wherever a cotton crop can be planted, it is planted regardless of all system and rule. It is well known that a corn crop, followed by oats the same fall, with pease on the stubble the next summer, is excellent preparation for a cotton crop the season following; and also that, when these red lands are in good heart and well tilled, that is, when they are in condition to yield from 1,000 to 1,500 pounds of seed-cotton, they will with great certainty produce from 20 to 40 bushels of corn, 30 or 40 bushels of oats, as much as 100 bushels having been gathered more than once, and two tons of pea-vines, or without the pease, and will yield spontaneously in good seasons two cuttings, and in bad seasons one cutting of excellent crab-grass hay; all this, too, at a cost less than the culture of a crop of cotton necessitates and with advantage to the land. Nevertheless, these being crops mostly consumed at home and not considered as market crops, it is seldom a farmer is found willing to cultivate them and forego the yearly revenue in ready cash of his cotton crop.

METAMORPHIC REGION.—The usual depth of tillage is 4 inches on the land side of the furrow. In Abbeville, Spartanburgh, and portions of Chester, it is generally only 3 inches; in parts of Fairfield it is only 2 inches; but in some portions of Chester it is from 6 to 8 inches. The draft employed is almost always one horse, but in a very few instances two horses are used. Subsoiling has only been practiced on a small scale, chiefly as an experiment, generally with excellent results.

Fall plowing is very little practiced; it is opposed to what is known as the "David Dickson method of culture", which is the prevalent one, the opinion being that lands broken up in the fall become tightly packed by the winter rains; an evil not counterbalanced by the disintegrating influence of frosts in this mild climate. The additional expense is also a consideration. To the limited extent to which it is done five reports give the results as good, and in York and portions of Chester it is reported as greatly on the increase; five other reports state that it is of doubtful or of no advantage.

Rotation of crops is nowhere reduced to a system. With a moderate use of manures and careful culture the same lands are planted for years in cotton, as it is thought not only without deterioration but with actual improvement. The ratio which the price of cotton bears to that of meat and corn affects the succession of crops more than anything else. Nevertheless there is but one opinion as to the beneficial influence of a rotation of crops as a cheap means of preserving the thriftiness of the soil. The succession of crops, as elsewhere in the state, is cotton, corn, and small grain. The clean culture of cotton leaves the land in good order for any crop, and the small grain is planted in the same year after the corn is gathered. Usually the land is kept in cotton for from three to five years, and after one crop of corn and small grain is taken from it the culture of cotton is resumed.

Fallowing forms no part of the system of culture, and it is thought that the exposure of the soil by tillage to the summer sun is injurious. The fallows consist chiefly of the lands lying out after the small grain is gathered in May and June, and even then are generally used as pastures for stock.

The old fields are preferred in many instances to other wood lands, and they are being cleared of the short-leaf pine that covers them, and replanted. They produce well with fertilizers, and under careful treatment are thought equal to any of the land. One of the principal reasons for abandoning these lands, in the first instance, was the washes and gullies produced by the unskillful use of the plow. Efforts to remedy this by horizontal culture and hillside ditches where intelligently made, especially where the plumb or the level has been used to lay off the runs or the ditches, have been very successful. Unskillfully made ditches, however, often do more harm than good. Filling the gullies with brush is a safer and a very effective practice, but no attempts at underdrainage to remedy washing has been made. The damage is mainly to the hillsides, and it is seldom that the bottoms are injured by the detritus they receive.

Manuring has for its basis cottonseed. About 1,000 pounds of cottonseed is obtained from each bale of cotton, which makes 137,000 tons the supply of this region. Of this 25,000 tons, at 2 bushels per acre, is used for planting, and a small amount is fed to stock. None is carried to the oil-mills, and very little is sold, the price being from 10 to 15 cents a bushel, the balance, about 100,000 tons, being returned to the soil as manure. For small grain, it is sown broadcast and plowed in with the seed in the fall; for corn, it is killed by heating and applied in the hill; for cotton, it is becoming the practice to compost it with acid phosphate and stable manure, sometimes with the addition of other litter and lime. It is applied in the drill at the rate of a ton to from two to four acres. This leaves a large portion of tilled land to be supplied with manure from other sources. Corn rarely receives any manure, and the deficiency for the cotton lands, when the cotton-seed and stable manures are exhausted, is supplied by the purchase of commercial fertilizers. The amount purchased in this region reaches an aggregate cost of nearly \$1,500,000, or \$1 98 for each acre planted in cotton. It varies from a maximum of \$3 33 per acre in cotton in Spartanburgh to a minimum of 92 cents in Abbeville. It is used most extensively in Spartanburgh, Greenville, York, and Anderson to stimulate the growth and maturity of the cotton-plant in these counties, which, being more elevated and nearer the mountains, have a shorter growing season. In Newberry, the county of the region most productive in cotton, the average is \$1 02 per acre in cotton. Green manuring has been practiced only as an experiment. Such experiments with pea-vines have had a very promising success, but it has been found better to allow the vines to wither before turning them under.

PIEDMONT REGION.—One-horse plows are generally used, very rarely two horses. The depth of the furrow on the land side varies from 3 to 4 inches.

Subsoiling is not practiced. Occasionally lands lie fallow, and the result is beneficial if stock are not allowed to destroy the crop of grass and weeds. Cultivated fallows are unknown.

There is no system in the rotation of crops. After land has been planted two or three years in cotton it is planted one or two years in wheat, corn, or oats; the results of such a change are excellent if stock is kept off the stubble.

Fall plowing is little practiced; it has been found of advantage where stubble, grass, or weeds cover the land to turn them under at this time. The amount of land in old fields is not great. Such fields, after lying out eight or ten years, have been found to produce as well as ever, and most of them have been brought into cultivation again.

The washing of hillsides does not amount to a serious evil, and it is reported as easily prevented and effectually checked by hillside ditching where necessary.

The use of commercial fertilizers has largely increased with the facility of obtaining them by railroad, and the practical demonstration of their value is in the culture of cotton.

Cottonseed is worth from 10 to 15 cents a bushel; little of it is sold; it is applied green and broadcast as manure for wheat, and composted with stable manure and fertilizer for cotton. A portion is fed to stock.

PLANTING AND CULTIVATION OF COTTON.

COAST REGION.—A mule can do the plowing required in the cultivation of 30 acres in sea-island cotton, and can, in addition, cultivate a sufficiency of land to supply corn for its own feed, perhaps something over. The first step in the preparation of the land is to hoe off the weeds ("hurricane"), cut up the cotton-stalks, and pile and burn this litter. This costs 40 cents per acre. Bushes are grubbed up at a cost of 7 cents per acre. The land is not broken up broadcast with the plow, but early in February two furrows of a single-horse turning-plow are run in the old alleys, making a trench 7 or 8 inches deep. In this furrow a subsoil plow may or may not be run, according to the character of the subsoil. Wherever underdrainage is practiced, as on James island, this furrow is generally used. Before plows came into use this trench was never made, and even now it is omitted by some of the most successful planters. Into this trench, or into the middle of the alley where there is no trench, the manure is placed. This consists usually of about 20 cart-loads of marsh mud and from 1,000 to 1,400 pounds of cottonseed. Stable and lot manure, together with composts of marsh mud and rushes, are also applied in this furrow at the rate of 40 cart-loads per acre on such a portion of the land as the limited number of stock enables the farmer to treat in this method. On the lines of manure thus laid down a certain quantity of commercial fertilizer is drilled. This practice, wholly unknown formerly, is very common now, even the smallest negro farmers often going heavily in debt to obtain these fertilizers from the storekeepers. They are handy, obviate the labor and care of stock, and the forethought and toil of collecting and manipulating composts. On James' island and John's island a mixture consisting of 250 pounds acid phosphate, 200 pounds kainit (German potash salt) and 200 pounds calcined marl is applied per acre. On Edisto island they use 200 pounds fish scrap (half dry in barrels), 200 pounds kainit, and 200 pounds acid phosphate per acre. On Saint Helena island little fertilizer is used. Cottonseed is worth from \$15 to \$20 per ton, and the commercial fertilizers from \$15 to \$30, which would make \$15 an acre the cost of manures among the best farmers.

The land is now ready for listing, which is done by hauling on to the manure with a hoe the soil from the tops and sides of the old bed. A more recent practice is to lap in with two furrows with a turning-plow on the manure. This costs only 17½ cents per acre, while the listing with the hoe costs 80 cents, although the latter has the great advantage of bringing all the vegetable mold and humus directly to the spot where the roots of the plants are to

grow. Over the mass of dirt, weeds, manure, etc., thus collected in the old alley, a double roller, 5 feet from center to center, and weighing about 800 pounds, is passed to press together and compact the whole, completing two rows at a time. All this should be completed by the 1st to the middle of March, and the bed is then built up by lapping in two furrows on a side, with a single- or double-horse turning-plow, on the manure.

The land is now ready for planting, which may begin any time after the 20th of March; but from the 1st to the 10th of April is the time preferred. Cotton planters are not used. Three hands do this work; the one in front chops a hole with a hoe on the top of the bed at intervals of from 12 to 18 inches; another hand drops 8 or 10 seed in each hole, and the third follows and covers carefully with the hoe. Three to four pecks of seed are used to the acre. The seed makes its appearance above ground in from 8 to 12 days after being planted, and the stand is perfected from the second week in April to the first week in May.

Hoeing begins about the 1st of May. The second hoeing takes place the last of May. The plows then break out the middles (the spaces between the new beds where the old beds stood). The hoe hands follow and pull up the loose dirt left by the plow to the foot of the cotton. This is called hauling; by it the new bed is completed, the cotton is kept from "flagging" (falling down), and the grass is kept under. It costs 80 cents per acre.

At the second hoeing some stalks are thinned from the bunch in which the seed breaks the ground, and at each succeeding hoeing and hauling other stalks are removed, until in July only one stalk of each bunch is left. There are four hoeings and four haulings by the last week in July, one or more furrows with a sweep-plow being run through the middles previous to each hauling. By the last of July the culture is completed, except to run a furrow with the sweep between the rows in August to destroy grass and keep the cotton growing.

The first blooms appear about the middle of June, when the cotton is 15 inches high, and the bolls open toward the end of August, when the plants have attained a growth of 4 or 5 feet.

Cotton picking commences from the last week in August to the second week in September. For the first picking, while the cotton is thin, $1\frac{1}{2}$ cents per pound seed-cotton is paid. Subsequently the price is 1 cent per pound—never less until the last of November, when it rises again to $1\frac{1}{2}$ to 2 cents. By the 15th December the crop is gathered.

Mr. W. E. Fripp, a progressive planter on John's island, remarks, in concluding his report: "No improved implements are used or needed in sea-island cotton culture." "Any one hand, with ordinary implements and management, can make four times as much cotton as he can gather." Naturally this suggests the reflection, what is to be done in a region devoted almost exclusively to cotton culture with the three hands not needed during the cultivation of the crop, but of paramount importance during the picking season. What industries can be introduced to give them employment? It would seem whatever they are, they must be of such a character as is suited not only to cheap labor, but to cheapen labor. Already the cotton picker pockets one-sixth of the gross value of the crop, and is a heavy burden on the producer. At \$7 50 per bale, which is below the actual cost of picking, it requires an expenditure of \$40,000,000 or \$45,000,000 to gather the crops now made. This large sum is paid out in the space of two months for work in which the most unskilled and least robust laborers excel. Just here there is a gorge in the industry of the cotton belt piling up a vast reserve of stagnant energies to surmount the obstacles of cotton picking. Should it ever be removed, and machinery be invented to reduce the cost of this work, improvements in culture would follow so rapidly, and the product of cotton could be so greatly increased, that besides being used for clothing it might become one of the cheapest materials for building purposes. Everywhere, in the production of this staple, improvements are possible to an indefinite extent; but when cotton picking is reached, there, as in gold digging, the only resource left is manual labor.

LOWER PINE BELT.—Under the best system the land is broken up broadcast with single or double plows, in the winter or early spring; but the prevailing practice is simply to turn the old beds into the alleys by running the bar of a single-horse plow to them, making two to four furrows to the bed, the usual width of the rows being $3\frac{1}{2}$ feet. This leaves an open furrow in the center of the old bed, in which the manure is deposited as early as practicable in February and March. The furrows are then re-covered and the dirt thrown up on the manure, the bed built up again, and the land is ready for planting.

The seed used belongs to the more prolific and improved varieties of short staple, and passes under the names of Dickson's or Herlong's improved, select, or cluster cotton. From one to three bushels are sown to the acre.

Cotton-planters are much used, a cheap machine drawn by a mule, rolling on a wheel similar to that of a wheelbarrow, by the rotation of which motion is imparted to fingers that keep the seed moving in a hopper containing them, and from which they fall into the furrow; a plow in front of the hopper opens a trench to receive the seed, and a board follows and covers. There is an arrangement to regulate the amount of seed sown, and a good hand and mule will easily plant six acres a day, and do it in the best manner. The only objection to the use of the machine is the difficulty of obtaining a careful hand to work it; simple and easy as it is, practically it is found they allow the seed to give out, plant them too deep, or neglect to cover them—such carelessness, which may escape notice at the time, resulting as irreparable loss, in injury to the stand. On this account much seed is sown in a trench opened on the top of the bed, made with a plow or some implement devised for the purpose, or in holes chopped at proper intervals with a hoe. The latter method has the advantage of spacing the plants more accurately than can be done after they come up, by chopping them out with a hoe.

Planting takes place about the 10th of April. The seedlings appear above ground in five to ten days, although when late planted, in a dry time, they may remain in the ground for four weeks, and when the rain comes still give a good stand. The work of chopping out the plants in a drill to a stand from 12 to 15 inches apart is commenced as soon as they are firmly set; that is, when they have a height of 5 inches and the third or first true leaf makes its appearance. It is desirable to complete the thinning early in June, in order that the plants may spread when the forms or squares are making their appearance.

The after-cultivation consists, usually, of four hoeings and four plowings, to keep the plant free from grass and the surface soil light and porous. These are completed from the last of July to the 1st of August.

The plant attains a height of from 10 to 15 inches before blooming, and the first blooms make their appearance from the 1st to the 20th of June. The first open bolls are seen from the last of July to the middle of August.

Picking commences from the middle of August to the 1st of September. By the 10th of November the cotton is generally all picked.

Black frost occurs sometimes as early as the 20th of October, but is not counted on until the middle of November, and it is sometimes deferred as late as the middle or end of December.

Cotton attains a height of from 2 to 4 feet, and is most productive at 3 feet. Fresh upland, unmanured, yields from 300 to 1,000 pounds of seed-cotton, the average being safely set at 600 pounds. Under good cultivation, even without manure, five crops may be taken without diminishing the yield; 1,425 pounds of seed-cotton is thought, on an average, to yield a bale of 475 pounds of lint, and the estimates of the amount required for this purpose range from 1,190 to 1,540 pounds. It is thought by some that the staple on old is shorter than that on fresh land, but so nice a point is difficult to decide, and there is no general opinion on the subject.

UPPER PINE BELT.—The first step in preparation for planting cotton is to dispose of the old stalks; if small they are not attended to; ordinarily they are knocked to pieces by hand with a club. Machines have been devised for this purpose, but have not proved successful, thus leaving a field open to inventors. When the stalks are very large, say from 4 to 5 feet high, they have to be pulled up, and sometimes to be burned. Some planters pull up the stalks and lay them in the furrow on which the bed is to be made; it is objected to this practice that the plow in cultivation strikes the buried stalks and destroys the young cotton.

The furrow of the bed is either run in the alley between the rows or the old bed is barred off and the furrow run through its center. The first practice alternates the cotton rows every year, the second plants on the same spot. The rows are rarely less than 3 feet 3 inches apart; they average 3½, and are sometimes 4 and even 5 feet on land making a large growth. The manure is placed in the furrow and the bed is built up in February and March, the object being to get cottonseed in and covered as early as possible to prevent its sprouting and heating after planting, which is injurious to the stand. In Marlborough the fertilizers are not applied with the cottonseed, but a furrow is run through the bed just before planting, and the fertilizer put into it then. The usual practice has been to put the manure in as deeply as possible; a practical difficulty in accomplishing this arises from the settling of the finely pulverized and lightly thrown up beds; the finer and specifically heavier particles of the soil pass through and under the coarser and lighter cottonseed, compost or stable manure. So that even after the greatest care has been taken to cover them deeply they disappoint the planter by appearing at or near the surface during planting or the subsequent cultivation of the crop. A very successful practice in Aiken and Barnwell counties has been to put the manure in a shallow furrow, but to finish the bed by splitting with a double-horse shovel-plow running to the depth of 14 inches. This leaves the sides of the beds and the alley light and loose, and it is kept so by after-cultivation. The sweep runs shallow in the harder soil near the plants, and deeper in the looser soil of the alley, and can thus skim the surface and destroy weeds near the plant without cutting the roots; the drainage of the bed is increased, and loose earth is provided, where it alone can be maintained during cultivation in the alley, to absorb atmospheric moisture, and to dirt the plant or the manure.

Planting occurs during the month of April, from the first to the 30th. Early planting runs the risk of frost, late planting the risk of a dry spell, which not unfrequently prevents cotton planted the last of April from coming up before the first of June.

Bancroft's or Dickson's improved cluster cottonseed is generally used; a prolific cotton, making a good yield of lint, being sought after, without regard to the quality of the staple. Improved staples have been produced, and are profitably cultivated by the larger planters who ship it themselves to the north or to Europe. Smaller farmers, confined to the home markets, cannot sell such staple to advantage, and therefore neglect it.

The quantity of seed used depends on the method of planting; in drilling by hand, the most common practice, 3 bushels are required; with the planter, which is coming more into use, 1 to 1½ bushels answers; with the dibble, a two-wheeled implement, drawn by a horse, the wheels running on the beds and making the holes for the seed by blocks fastened on the tires, a half-bushel will do.

The seed comes up, according to the greater or less favorableness of the season, in from four to ten days after planting. The young plants are thinned out to hills from 8 to 12 inches apart, sometimes to 18 inches; usually only one stalk is left, some prefer to have two. Thinning occurs from four to six weeks after planting, from the time that the third to the sixth leaf makes its appearance, and is completed early in June.

The after-cultivation of the crop consists of four or five plowings with the sweep and three or four hoeings, and is completed from the last of July to the last of August.

Blooms first appear when the plant is from 6 to 12 inches high, from the 10th to the 20th of June. Bolls open from forty-two to forty-five days after the bloom, in the latter part of July and first of August.

In favorable seasons picking has commenced before the 12th of August; ordinarily not until the 20th. The cotton is picked and ginned as fast as it opens and the work can be done, the best planters estimating the loss of leaving it in the field for a few weeks, even during good weather, as very heavy. All the crop is picked by the 1st to the 15th of December, and by far the most of it is in the market before Christmas.

RED-HILLS REGION.—The culture of cotton differs in no regard here from the methods pursued in the upper pine belt, except that the lands being stiffer here, the use of the sweep plow is sometimes replaced by using the shovel or the turning-plow in the cultivation of the crop.

The plant is subject to the same enemies and diseases here as in the upper pine belt, and the practices for overcoming them are also the same. Among their enemies grass is chiefest. Of the grasses nut-grass is the worst, although it is less feared here on stiffer land than on the lower soil of the lower country, where the hoeing necessary for its extermination often injures the stand by causing the dirt to fall away from the plant, and the plant itself to fall down and die. The ardor with which the war against grass in the cotton-field has been waged, and the persistency of some grasses, especially of the crab-grass and the crowfoot, in spite thereof, has induced some farmers to conclude that the true method of making hay on these lands is by summer cultivation. They have found by experiment that if these lands are kept loose and free from weeds until a good season of rain causes them to be well set in these grasses, a good mowing can be obtained with great certainty.

Cotton picking in this region commences from the 12th to the 25th of August, varying in different years with the character of the seasons. It is fully under way by the 1st of September. Half the crop is usually gathered by the 1st of October, and picking is concluded from the 25th of November to the 10th of December. Formerly it was not unusual to see fields white with cotton at Christmas time, a thing not known now. This may be due in part to a selection of seed that opens more fully at one time, and to assisting this by the use of fertilizers that favor an early and complete maturity of the plant. Also to the general withdrawal of negro women from all farm work except cotton picking, thereby increasing the number of pickers in proportion to the producers of the staple.

METAMORPHIC REGION.—Fallow lands, or lands that have been in other crops, and sometimes the heavy red lands are broken up broadcast during winter and spring. The great body of the lands, however, being planted year after year in cotton, the usual method is to lay off in the alley with a shovel-plow, drill in the manure and bed to it with a turning-plow. Three to five furrows complete the bed, and the land is ready for planting. On the thinnest lands the rows are 2½ feet apart, generally they are from 3 feet to 3½ feet, and on the strongest lands they are 4 feet.

Planting commences on and after the 10th of April, and is completed on or before the 10th of May. The seed used is the short-limbed cluster variety of cotton known under the name of Dickson's improved or Boyd's prolific Petit-Gulf. It is rather a delicate plant, a prolific bearer of early maturity, and a short staple.

Carefully sown 1 bushel of seed will plant an acre, though as much as 3 and sometimes 5 bushels is used; with a planter 2 bushels answers, and 2 to 2½ may be taken as the average. Most of the seed is sown by hand in a furrow opened by a small plow and covered by various devices of boards propelled by hand or by a horse. On smooth, well-prepared, land, planters, especially the Dowlaw, are much used, and well thought of.

The seed comes up in from four to ten days in favorable seasons; late plantings in dry seasons are longer in appearing and may not come up for a month, and then give a good stand; this occurrence is always a misfortune, as it not only retards the crop, but allows the grass a chance to overtake it.

As soon as the stand is perfected, thinning commences, and the cotton is chopped out with a hoe to spaces varying from 6 inches on thin lands to 18 inches on the strongest, usually to from 9 to 12 inches.

The after-cultivation consists in keeping the ground light and loose by the use of the plow, and in keeping the grass out of the row with the hoe. A great variety of plows are used for this purpose, twisters, turn-plows, shovels, and harrows; the later workings, when the plant is fruiting, are usually given by passing twice through the row with a sweep which skims the surface. Generally there are four plowings and four hoeings, but sometimes three plowings are sufficient.

When the plant is from 10 to 15 inches high, usually about the 1st of July, it begins to bloom, though blooms are sometimes noticed as early as the 15th of June.

Open bolls appear about the middle of August; in favorable seasons they are sometimes seen the last of July, and at other times not until the 1st of September. Although in some instances the plant grows as high as 4 or 5 feet, the height at which it is thought to be most productive here is from 2 to 3 feet.

Picking may commence about the 25th of August, but it is not in full blast until from the 1st to the 20th of September. The crop is gone over three or four times, and it is all out of the field by Christmas, sometimes as early as the 20th of November.

PIEDMONT REGION.—Cotton culture was a leading industry in the upper counties of South Carolina previous to 1826. The crop varied from 120 to 200 pounds of lint per acre in the four most northerly counties, and averaged

145 pounds. At that date, however, and for long afterward, probably not an acre of cotton was planted in the region now under consideration. The opening of the Air-Line railroad having reduced the cost of fertilizers, attention was drawn to the large bodies of gray sandy lands, hitherto little considered, and experiments in cotton growing by their aid proved so successful that the culture was largely increased. It has extended over the tablelands and even up the mountain slopes, and is now grown in every township of the region except one, Chattooga township in Oconee county, already referred to as the culminating point of the river system. It has been found that while the season is shorter the stimulation of the growth by the use of fertilizers compensates for this.

The same tillage as is given further south expended here, in a shorter period of time, has a like effect in pushing the plant to maturity. With slave labor this was inconvenient, if not impracticable. It has been further found that the growth of the plant is steadier here; it does not suffer from those checks during long dewless intervals which retard its progress in hotter and drier sections. The claim is also made that better cotton is grown here than further south. Experienced cotton buyers have long given the preference to staples of both long and short cottons grown toward the northern limits, respectively, of their culture. It is said that the fibers are stronger and of more equal and uniform length, admirable qualities, which might naturally be expected from a short, steady, and continuous growth. For all these reasons, together with the improvements in the selection of seed, by which the period of growth is lessened, and an earlier and more simultaneous ripening of the fruit is obtained, it is expected that what has been already done is only the commencement of a much wider extension toward the mountains of the growth of the cotton-plant.

No peculiarities of cotton culture are to be noted in this region. Little or no previous preparation is given to the soil until it is thrown into ridges from 2½ to 4 feet apart, according to the strength of the land just before planting. The seed is planted from the 10th to the 20th of April, commencing on the same date as in the region below, but concluding earlier by from 10 to 20 days.

About two bushels of seed are used to the acre, and it is for the most part sown by hand, the outlay of \$12 for a planter being generally considered too great for the advantage gained, especially by small renters, who hold their farms only for the crop season.

The seed comes up in from 6 to 15 days. The variety preferred is some of the cluster cottons, prolific bearers of early maturity.

In two weeks after planting the cotton is chopped out with a hoe to about 12 inches apart, sometimes to only 6 inches, and on very strong land intervals of 18 inches between the plants may be left. If the soil be well stirred with the plow and kept clean in the drill with the hoe the cotton will have attained a height of from 8 to 18 inches by the 1st to the 10th of July, when blooms will appear.

The first blooms are now looked for the latter part of June, but until the last year or two they were never expected before the 4th of July, and even that was thought early. Open bolls are seen from the 25th of August to the 1st of September.

Picking commences from the 10th to the 15th of September. The growing season ends with the first black frost, which occurs about the 15th of October or the 1st of November. The crop is gathered by the 15th to the 31st of December.

The plant is considered most productive when it attains a height of 2 feet. Fresh lands yield from 700 to 1,200 pounds of seed-cotton. The same lands after from two to ten years' culture without manure yield from 400 to 600 pounds of seed-cotton; with moderate manuring and fairly good culture they improve. It is estimated that it requires here an average of 1,455 pounds of seed-cotton to produce a bale of 475 pounds.

GINNING, BALING, AND SHIPPING.*

Ginning presents no peculiar features in the state. Sixteen different saw-gin patents are mentioned for the short-staple cotton, while for the sea-island long-staple variety the McCarthy roller-gin is used. Steam, water, and horse powers are used, and the amount of lint made in a day's run varies with the number of saws in the gin and the power employed.

The roller-gin, with steam-power, makes from 400 to 600 pounds of lint in a 10-hours' run; this lint is packed, by hand pressure, in round bags 7½ feet long, or, as the correspondent from John's island expresses it, "the press used is a hole in the floor, hung bag, iron pestle, and a negro." Three bags per day can be thus pressed. The weight given these bags of long staple is about 350 pounds; 1,600 of the seed-cotton is required for 400 of lint. They are not bound with ties as are the bales of short staple.

Upland cotton is put up in bales of from 425 to 550 pounds, as reported. Rather more than half the reports give 500 pounds as the weight of a bale. Iron ties are used exclusively.

The tendency of custom and of legislation is toward charging freight by weight, but reports vary greatly as to local practice. One line is reported as charging by measurement of space occupied; some lines are reported as charging by weight; some as charging by the bale, without regard to size; some as charging by the bale, but for all excess over certain weight, which weight is reported in different cases as 400, 450, and 500 pounds.

* The matter under this head has been compiled directly from the schedules.—E. W. H.

DISEASES, INSECT ENEMIES, ETC.

COAST REGION.—As has been already stated, the long-staple cotton is a more vigorous grower and less subject to disease than upland cotton. Neither sore-shin, blight, rust, or the shedding of fruit in unfavorable seasons seems to affect it to the same extent. Its enemies are in the vegetable kingdom, weeds and grass, especially the nut-grass and the Bermuda, and against these the constant and skillful use of the hoe and plow are the only safeguards. The most dreaded enemy of the crop is the cotton caterpillar, which makes its appearance in warm wet spells in the latter part of summer, and speedily consumes the foliage. At one time so great and constant were the depredations of these worms, that it was feared that they would, as they did for some years, put a stop to the profitable culture of this crop. Now, however, by the use of Paris green the planter counts securely on contending successfully with them, and no crop has been lost in late years where it has been used in season.

A mixture of 1 pound of Paris green, 1 pound of rosin, and 40 pounds of flour is dusted by hand over the leaves on the first appearance of the worm, and this inexpensive process secures exemption from their ravages even when they come in such numbers and work with such rapidity that the portion of a field not treated to the mixture, in consequence of the intervention of Sunday, is consumed beyond remedy.

LOWER PINE BELT.—It may be safely said that more injury is done to cotton in this section by grass than by anything else, and the only remedy that can be devised against this is hoeing and plowing. Crab-grass (*Digitaria sanguinalis*) is the chief intruder. In warm and wet seasons the cotton-plant sometimes grows too much to weed when heavily manured. Topping is tried as a remedy, but it is thought that underdrainage would be more effective.

"Sore shin" is supposed to result from bruising the plant by careless hoeing, and is not a trouble of much consequence here.

Shedding occurs in extremes of heat and cold. Rust and blight make their appearance late in July and August; they are attributed to the exhaustion of some elements of the soil, and potash is very popular as a remedy; they are likely to occur on coarse, sandy, ill-drained soil.

The caterpillar is seldom hurtful, and Paris green has been used successfully for its destruction.

UPPER PINE BELT.—There are few crops grown anywhere more certain of success than the cotton crop in the upper pine belt. A complete failure never occurs, and a reduction of 20 per cent. in the yield is an unusual occurrence. The greatest variations have been in an increase of product under better cultivation, and it is believed that a wide field for development lies in this direction. The principal obstruction to the growth of the plant is the crab-grass, necessitating constant labor and vigilance, or resulting in fatal injury to the crop. Usually the task is one acre in hoeing, which is completed by dinner time; but most frequently it is far from being thoroughly done. In Marlborough, where the work is well done, and perhaps on this account, two acres is the task, and it is usually completed by 4 p. m.

Drought is very seldom injurious except during the fruiting season in July and August. Sore-shin, except as resulting from bad hoeing, is not known.

Licé, a minute aphid, appears on the under side of the leaves in May and later, and gives them a curled, but at the same time a deeper green appearance. Dry weather is favorable to them, and in good seasons they are not thought to injure the plant. Some say they promote fruitfulness. In bad season, *i. e.*, excessive drought, during fruiting, rust appears earliest and is most injurious where they have been most numerous.

Rust and blight affect the crop especially during the fruiting season; it is most injurious to the prolific short-limbed cluster cotton. Under favorable conditions the plant will take on a heavy crop of fruit in from four to six weeks, any time from the middle of June to the middle of September. At such a period it will cease to grow, the leaves will pale and turn red, all the energies of the plant being devoted to reproductive efforts. Commercial fertilizers promote this crisis by contributing more to the fruitfulness than to the growth of the plant. Any vicissitude of the weather, heat or cold, wet or drought, will seriously enfeeble or even kill the plant in this, its term of labor, especially on poor, sandy, or ill-drained soils. A crop will have been made, the utmost that the soil, the variety of seed, and the seasons admit of, but the future growth and fruitfulness of the plant is checked or destroyed. This is what is equally termed rust or blight. The remedies are, varieties of the plant that are more vigorous growers, those of longer limb, and less given to excessive fruiting; stable manure in the place of fertilizers; the potash salts, which are used with marked benefit; and thorough drainage.

Cotton sheds by far the largest portion of the "forms" which come on it, and the closest observers state that in the great mass of our cotton lands the cotton-plant will not in the best of seasons mature into open bolls one in five of the blossoms that appear, generally not one in ten. Remedies for this are being sought in the selection of seed, and in various methods of culture, but nothing decided has been thus far obtained.

When the early season is wet and warm, the plant may run too much to weed. Some attribute this in part to late thinning and deep cultivation; others think it may be checked by running a deep, narrow furrow, closing after the plow, close to the cotton. Short-limbed varieties of cotton, and cottonseed, and phosphates as fertilizers are recommended as remedies.

Although the cotton caterpillar moth is frequently met with, even during the severest winters, the worm rarely makes its appearance before September, and hardly ever does any damage.

METAMORPHIC REGION.—In its early growth, unless in exceptionally windy and cold seasons, or through bad hoeing, cotton does not suffer here at all from "sore-shin". Nor does it often run to weed, though in unusually warm and wet seasons or on strong fresh land this may occur; cultivation and manuring are thought to check excessive growth and to promote fruiting.

Worms are rarely seen in this region and are not at all feared. Shedding and rust are often injurious. The first is likely to occur during alternations of dry and wet weather.

Black rust is confined to ill-drained soils, especially to those of the trap-rocks. Wet weather is more likely to affect the cotton-plant injuriously here than dry and hot weather.

No crop grown anywhere over so extensive an area is more certain than is the cotton crop in this region. Drainage and stable manure with fairly good culture are unfailing remedies for such diseases as have as yet affected it. The enemy most dreaded and most certain to require the best efforts of the farmer to hold it in check is grass, and with one consent the species is known as "crab-grass" (*Digitaria sanguinalis*), a corruption, John Drayton says, of crop-grass, as it was unknown until the land was cultivated. De Brahm, writing of Carolina in 1752, says:

By cause new land produces scarce any grass, & once hoeing will do for the season, but the grass comes & increases in such a manner that sometimes three hoeings are scarce sufficient in one season; and when this comes to be the case the planters relinquish these fields for pastures & clear new ground of its wood.

This grass makes an excellent hay, attaining a height of from 2 to 5 feet, and yielding from 1 to 4 tons to the acre, according to the land and the season. Next to cotton picking, however, it is the chief source of trouble and expense in the culture of this crop.

PIEDMONT REGION.—Diseases and enemies are restricted here almost exclusively to one, viz, frost. Caterpillar is unknown. A little rust and shedding occur on ill-drained soils, but there is no general complaint regarding them. The vegetable enemy of the plant is crab-grass, with now and then complaints of rag-weed and may-pop vines.

LABOR AND SYSTEM OF FARMING.

COAST REGION.—On the sea islands of Carolina field labor is performed almost exclusively by negroes. Nearly all of them are engaged in farming on their own account; a large number own farms; a still larger number rent lands for cultivation, and even the laborers are paid most generally by granting them the use of a certain number of acres of land for certain stipulated services.

The total number of farms on the islands is stated to be 5,453, but the number probably exceeds 6,000, the enumerators having had the lands and crops cultivated by renters returned by the land-owners, and consolidating them as being under one management when they were, in reality, entirely independent—an error very likely to occur, and sometimes quite difficult to avoid.

The largest number of acres of sea-island cotton planted under one management nowhere exceeds 100 acres. The largest white planters do not probably average more than 30 acres, and this necessitates that he should be a landlord of considerable estate. For as the laborers are frequently given from 5 to 7 acres for two days' work in the week, and as this time does not suffice for the cultivation of more than 4 acres, to cultivate 30 acres of cotton under this system requires 75 acres of land; add to this the amount usually planted in corn and other crops, and we will have 120 acres. As under the best system the land lies fallow every other year, the planter of 30 acres of cotton will require 240 acres of open land; and as scarcely one-fifth of the land is under cultivation, such a planter will probably own some 1,200 acres. Thus there is no proportion between the size of the farm actually cultivated and the land holdings—the first being quite small and the last large. This state of things is owing to absence of capital and the low price of land and labor; lands which were worth from \$50 to \$60 an acre more than half a century ago (Mills' *Statistics of South Carolina*, pp. 372 and 472), and which increased in value down to 1860, being until quite recently either wholly unsalable or selling at \$10 per acre or less.

On James island, which at this time is perhaps under a more progressive system of culture than the other sea islands, laborers are paid cash for their work at the rate of 50 cents per diem and \$10 per month with board, the latter being a ration of 3 pounds of bacon and 1 peck of grits a week, with shelter and fuel. The soil and the condition of the laborers are reported as improving, and cash wages are considered preferable to the share or the land system of payment.

Arable land rents here at \$2 an acre per annum. The price of land is from \$15 to \$30 an acre. A few laborers own their houses, but very few own any farming land.

On John's island cash wages are from \$8 to \$10 a month with board. Most of the laborers, however, are engaged for two days' work a week by allowing them a house, fuel, and 6 or 7 acres of land free of rent; but the report is that the system is not satisfactory. The land worked by the landlords is improving; that worked by the laborers on their own account is deteriorating rapidly. The labor is not so easily controlled as when cash wages are paid.

The lands vary greatly in price, prices ranging from \$2 50 to \$20 per acre, with some lands valued recently still higher. Rent is higher than on James island, in consequence of a system that increases the demand by multiplying small farmers, and it is about \$3 per acre per annum.

On Edisto island the two-day system prevails. The laborer gives the landlord two days' work in every week during ten months of the year, and receives in return a house, fuel, and 6 acres of arable land, which, together with such other land as he may rent, he cultivates on his own account during the remainder of the week. When extra work is required on the farm, these laboring tenants are employed at 50 cents per day. The system is reported as being quite unsatisfactory, these two-day hands not cultivating more than two acres as an average for the proprietor, and burdening his estate with the support of a much larger population than necessary to its cultivation. By means of this, however, a large amount of resident labor is secured on the place, which is of prime importance during the cotton-picking season. The laborers themselves prefer this system, having four days out of the week for themselves; they are more independent, and can make any day they choose a holiday. As a rule, they are in comfortable circumstances, and about 7 per cent. are reported as owning homes of their own and some land.

The land for which they pay rent service generally deteriorates in value. The lands worked by the proprietors are among the very best on the sea-coast, and are improving.

The average yield of cotton on the whole island is a bale to 2.6 acres; for the six largest planters it is a bale to 1.7 acres. Considering the quality of the staple produced, it may be safely said that the larger farms yield between two and three times as much as the small ones.

Lands here are worth from \$10 to \$25 per acre; formerly they were worth from \$50 to \$70 per acre. Small tracts rent for about \$4 per acre per annum, larger tracts for less; and there is a state of things which tends to reduce the salable value of lands while it increases the rental value of it.

West of Saint Helena sound land is almost without exception in the hands of small negro farmers, either as tenants or proprietors. Much of this land, valued formerly at from \$40 to \$60 an acre, was confiscated as a war measure by the United States government. A good deal of it was purchased by negroes at the government sales at \$1 25 an acre, on credit, and is still owned by them. These small negro farmers have enjoyed many advantages. They bought their lands on easy terms, at from one-thirtieth to one-fiftieth of their value, and had the benefit of the famine prices of cotton during the war for their staple product.

The size of the landholdings is from 1 to 20 acres, and nowhere are more than 15 acres of cotton cultivated under one management. Much of the land is uncultivated, and the remainder is planted in small patches, varying from $\frac{1}{2}$ of an acre and less to 3 acres in size, consisting of corn, cotton, and sweet potatoes, curiously intermingled.

Nowhere in the state, not even among the gardens on Charleston Neck, is the system of small culture so strikingly illustrated. The farmers usually own a cow, a mule, or a horse, and the work stock is sufficiently numerous, though of a very inferior quality. Farm fixtures are of the simplest and cheapest description. There is seldom any shelter for the stock, the cabin of the proprietor being generally the only house on the premises. The stock is fed on marsh-grass, with a little corn, and is in a large measure subsisted by being picketed out, when not at work, to graze on such weeds as the fallow spontaneously furnishes.

Plows are numerous enough, but the chief reliance is upon the hoe, which for several generations was the only implement known to agriculturalists on this coast.

Since the war the industries connected with the working of the phosphate rock in the rivers and on the mainland adjacent to them have furnished the men with employment at higher wages than could be obtained elsewhere in the state. The opening of the railway to Port Royal harbor has also made a demand for labor in loading and unloading vessels at a better per diem than was elsewhere obtainable.

Graded schools were early established here, and have been maintained on a large scale uninterruptedly for many years. Fish, oysters, and game abound; and poultry, as chickens, ducks and turkeys, does particularly well.

The laborers live comfortably, happily, and peacefully. All the larger houses and buildings about the old farmsteads have rotted down or have been burned down, and have been replaced by small cabins, and a few country stores, where the traders, invariably white men, who take no part in the cultivation of the soil, collect and dispose of the crop and supply the community with such articles of food and dress as are required. Most of the men are engaged at the phosphate works or on the wharves at Port Royal, and the bulk of the farm work is performed by the women and children. Land is worth from \$10 to \$15 an acre.

Purchasing supplies on a credit prevails to a considerable extent, especially among the small farmers. The exact rate at which these advances are made cannot be given, as it is not charged as interest, but is included in an increased price asked for supplies purchased on a credit. It varies from 20 to 100 per cent. above the market value of the goods, according to the amount of competition among the storekeepers, who here, as elsewhere in the state, are by far the most prosperous class of the community, in proportion to the skill and capital employed. The better class of farmers do not approve of this credit system. It furnishes facilities to small farmers, encouraging them to undertake operations they cannot make remunerative to themselves; it reduces the number of laborers, and precludes high culture. The rental value of land is thus increased, and land which could not be sold for \$10 may be rented for \$5.

The thriftless culture resulting from the small farms, unduly multiplied by this unhealthy stimulus of credit, causes many acres to be thrown yearly out of cultivation. Thus the increasing demand to rent land, in consequence of the increasing facilities for credit to small farmers and the constantly diminishing area of arable land resulting

from the very imperfect system of culture their lack of means forces them to adopt, create high rents injurious to the small farmer, and impoverishes the landlord by deteriorating the quality of his land, as well as by abstracting the labor he would employ in remunerative culture.

LOWER PINE BELT.—In Colleton county the farms on which cotton is planted vary in size from 50 to 200 acres, and are, in some instances, as much as 400 acres. A system of mixed farming is pursued; food supplies mostly, and in an increasing degree, are raised at home. Bacon for the laborers, however, is usually bought in Charleston. There are a few white laborers, but the labor is chiefly performed by negroes. Wages vary from \$6 a month to \$120 and \$150 a year. Very few farms are worked on shares; when it is done, the landholder usually furnishes all supplies, and takes one-third of the cotton and one-half the provision crop. The share system is not entirely satisfactory. The quality of the staple is not affected by it, but the quantity produced is small, and the land deteriorates. Money wages are preferred, because they place the management under intelligent control, enables the laborer to meet his current expenses, and preserves his independence from debt. The condition of the laborers is good, and about 2 per cent. of the negro laborers own some land or the houses in which they live. The market value of land is from \$2 to \$5. The rent is from \$1 50 to \$3 an acre. The system of receiving advances on the growing cotton crop is diminishing.

In Williamsburgh county the farms on which cotton is planted vary from 100 to 600 acres in size. Mixed farming is practiced; the family supplies of the landlord being usually raised at home, those of the laborer purchased in Charleston; the tendency to raise supplies is increasing. There are some white laborers, but generally negroes are employed; wages, averaging \$8 a month, are paid monthly or oftener. A few cotton farms are worked on shares—the terms being a net one-quarter of all the crops for the landlord, he for the most part advancing all supplies. Land deteriorates under the share and improves under the wage system, which latter is better for the laborer, his energies being more intelligently directed his labor is more productive and worth more, besides it induces economy, enables him to understand fully his financial condition, and he is more satisfied at the end of the year than when there is a settlement of accounts, the run of which he cannot keep. There is little demand for land; the price ranges from \$2 to \$15 per acre. It rents for from \$1 to \$2 an acre; more generally for one-quarter or one-third of the crop. The system of credits and advances on the growing cotton crop prevails largely, from one-half to three-quarters of the farmers, black and white, receiving such assistance.

In Clarendon county the usual size of a cotton farm is 80 acres. Mixed farming is practiced, but much of the supplies consumed is purchased in Charleston, though the tendency to raise them at home is increasing. The field labor is performed by native whites and negroes. Laborers are usually contracted with by the year, and the settlement takes place at its close. One-third net of the crop to the landlord is the usual rate, where cotton farms are worked on shares, he advancing all supplies. The share system is preferred to wages. The condition of the laborers is good, and about 5 per cent. of them own houses and lands. Land is worth from \$3 to \$5 an acre, and rents for \$1 per acre. The liens for advances on the growing crops recorded in the clerk of court's office for the year number 2,716, or one to every farm save nine, and aggregate \$283,317 18.

In Horry county the farms average 50 acres and run from 10 acres to 200 acres in size. All supplies are made at home. The laborers are largely white natives, but there are some negroes. Wages, from \$5 to \$16 by the month—from \$50 to \$125 by the year. No cotton farms are worked on shares. The soil improves under culture. The wage system is preferred. The condition of the laborers is good, and about 12 per cent. of the negroes own houses and land. Unimproved land sells for from \$1 to \$2 an acre; very few advances on the crop, and those wholly for fertilizers. The liens on the growing crop recorded in the clerk's office number 27, and aggregate \$1,179 80.

UPPER PINE BELT.—A mixed system of farming is pursued in the upper pine belt, and the attempt is made to raise at least a portion of the necessary supplies. They are not raised, however, to the extent they were formerly, and although the reports all state that the tendency to raise them is now increasing, the deficiency still remains very great, as the number of liens given for provisions and recorded against the growing crop show.

In Barnwell there were 2,026 liens, averaging \$125, being \$8 80 per bale of cotton produced; in Orangeburgh there were 2,470, liens, averaging \$90, being \$9 87 per bale; in Darlington there were 3,925 liens, averaging \$100, being \$16 40 per bale; in Marlborough there were 1,183 liens, averaging \$110, being \$5 40 per bale; in Marion there were 1,200 liens, averaging \$100, being \$5 50 per bale. The number of liens for 1880 show an increase on those given above for 1879. This does not indicate a diminution in the amount of supplies raised by farmers, but only shows an increase in the number of laborers who are seeking a credit, to enable them to do business on their own account as tenant farmers. It is by this class chiefly that the liens are given, mostly for provisions, next for fertilizers, and to some extent for mules and farm implements. It is the general experience that these small tenant farmers, mostly negroes, meet their obligations to the best of their ability; nevertheless, a mortgage given in January or February on a crop not to be planted until April, is not taken as a first-class commercial security, and consequently the charges on the advances are heavy; for instance, when the cash price of corn is 75 cents, the credit price is not unfrequently \$1 25 and upward.

West of the Santee and Wateree rivers, in this region, the average acreage in cotton to the farm is 14 acres; on only one farm is there over 400 acres in cotton; in 17 townships the maximum acreage is under 100 acres; in 20 townships it is from 100 to 200; in 5 townships it is from 200 to 300; in 2 townships it is from 300 to 400.

East of the rivers named there are farms having over 600 acres in cotton, the average acreage in cotton to the farm is 16 acres. Here 46 per cent. of the farms are rented, and 54 per cent. worked by the owners. Of the rented farms, 13 per cent. contain over 50 acres, while of those worked by the owners the area of only 20 per cent. are below that figure.

The laborers are chiefly negroes, but the number of whites engaged in field labor is largely increasing in some localities, especially east of the Pedee, where from one-third to one-half the field labor is performed by whites. The general price of day labor is 50 cents (and food), though it fluctuates from 40 cents to 75 cents. This class of laborers is also largely increasing, being recruited from the increasing class of tenant farmers, who supplement their earnings by hiring out when not busy with their own crops, or when pressed for ready cash. Contract laborers are becoming much fewer; the general wages is \$10 a month and rations, but in some localities it is as low as from \$6 to \$8, and in others as high as from \$12 to \$15, the higher prices prevailing in the northeast, the lower to the southwest, being less where the percentage of negroes is greatest, and *vice versa*. Hands hired by the year receive from \$90 to \$120, with rations, shelter, firewood, and truck patches; but they have always preferred, when contracting for a year's work, to have some interest in the crop, and this desire has steadily increased so as to have made this by far the most general practice. This has been arranged in so many and in such complicated ways as to preclude any general description.

For instance, a widely adopted system is one proposed as early as 1866 by a negro laborer in Silverton township. The laborer works 5 days in the week for the land owner, and has a house, rations, and three acres of land, with a mule and plow every other Saturday to work it when necessary, and \$16 in money at the end of the year. Had he worked $4\frac{1}{2}$ days per week for the land owner and $1\frac{1}{2}$ for himself, this would have been equivalent to one-fourth of the crop and his food. The \$16 was intended to cover the 52 half days more than that in which he worked for his employer, amounting in all to one month. This system proved very successful, and the second year a number of laborers proposed to work only 4 days, feed themselves, and take double the land and mule work, without the money. The third year three-day hands came in, furnishing in part their own work stock; and as some hands paid the rent for a house and an acre of land by giving 2 days work a week, there were found various classes of hands on the same places working from 2 to 6 days in the week.

The share system is practiced more largely in Barnwell than in Hampton, and still more in Darlington and Marlborough. The terms are generally the same, the employer furnishing land, teams, and implements, the laborer feeding himself and getting from one-third to one-half of the crop, after paying his *pro rata* for bagging, ties, and fertilizers. Chancellor Johnson (Marlborough county) says:

I have a good many tenants, white and black. I furnish the stock, food for it, pay one-half the blacksmith, fertilizer, bagging, and ties accounts, and furnish ginning facilities. The tenant (has his garden and potato patch free) does all the work, from repairing fences and ditches to preparing the crop for market. My advances are repaid, and the crop is equally divided. The tenants generally get at the rate of from 8 to 10 bales for each mule they work, grain for their family supplies and to make their meat. I get the same amount of cotton and more than grain enough for the next year's crop. I have had some tenants for over ten years.

He prefers hired labor where the plantation is not too large—that is, about eight plows. The advantage of either system depends upon the character of the individual, good tenants being sometimes poor laborers, and *vice versa*. Each locality reports favorably of the system pursued there.

In Hampton the wage system is preferred, the laborers run no risks, the soil is improving, condition of the laborers good, very few of them own house or land. Lands sell for from \$1 to \$25 per acre, and rent for from \$1 to \$3 in small patches; little land is rented.

In Barnwell the laborer decides under which system he will work. Share hands and renters pick cotton cleaner than wage hands. The wage system is preferred by the planters; the laborer runs no risks, his pay is net money, he spends it and lives and works better, and the land improves. The condition of the laborer is good and improving; quite a number own houses and lands. The market value of land is from \$3 to \$10 an acre, including improved and unimproved. The rent is from \$1 to \$3 in money, or in produce it is 75 pounds of lint cotton per acre, or 1,000 pounds of lint for a 40-acre farm, or a 500-pound bale for from 15 to 20 acres.

In the lower part of Orangeburgh year hands receive monthly \$6; the share system is also practiced there; no preference expressed between the two. The condition of the laborers is reported as good. The market value of land is from \$2 to \$10, and a good deal is rented from \$2 to \$4 per acre.

In Darlington wages by the year are \$120 for men, \$90 for women, with house, rations, fuel, and truck patches. The share system and tenant system are largely practiced; the laborers do not work so well, nor do they realize so much, but they prefer less with independence of control; their condition is good, and 2 per cent. own houses and land. The market value of land is \$10 per acre, and the rental yields about 7 per cent. on the investment.

In Marlborough and Marion a considerable part of the field labor is performed by whites; day wages are from 30 to 60 cents, by the month from \$6 to \$12, and the same when engaged for the year; in all cases with board.

The share and tenant systems are largely practiced. (See above for terms, etc.) The condition of the laborers is good, they are contented and happy, and from 3 to 5 per cent. of the negroes own land or a house. The market value of land is from \$10 to \$50 per acre, and rents are from \$3 to \$15 per acre.

From the southwest of Aiken county it is reported that the tendency to raise supplies fluctuates with the price of cotton, being increased by low, and diminished by high prices. The share system is largely practiced, the laborer having one-third when he feeds himself, one-fourth when he is fed; the land owner advances everything, and the laborer's proportion of the expenses is taken out of the crop. The share system is not generally satisfactory; it is difficult to get cotton cleanly handled; land worked under the supervision of the proprietor generally improves; when rented, especially to negro tenants, it rapidly deteriorates; 5 per cent. of the negro laborers own land or their house; those who work steadily are prosperous, the proportion that do this is not, however, large. The market value of land is from \$4 to \$15 per acre, including woodland; tilled land rents for from \$1 to \$5 per acre.

The following comparison, in some of the regards above treated of, between Darlington and Marlborough counties is offered, because in 1870 Darlington led all the counties in the state in the production of cotton, nearly doubling the crop of the county next in rank; now it stands eighth in total production, and Marlborough stands highest in the yield per capita and per acre; the counties lie side by side:

Comparative statement.

	Darlington county.	Marlborough county.
Yield in lint cotton:		
Pounds per capita	330	548
Pounds per acre	190	267
Amount of liens for each bale of cotton produced in 1879...	\$16 40	\$5 40
Percentage of farms:		
Worked by owners	43	55
Worked by renters	57	45
Under 50 acres, worked by owners	17	12
Over 50 acres, worked by owners	83	88
Under 50 acres, worked by renters	85	80
Over 50 acres, worked by renters	15	20

RED-HILLS REGION.—Although a system of "mixed farming" is claimed as the usual practice here, about one-fourth of the corn, one-third of the bacon, and one-half of the flour consumed on the farm is, under the most favorable circumstances, purchased; ordinarily a much larger proportion is bought. These supplies are for the most part brought from the northwest by railroads, and are chiefly sold to the farmers, especially the smaller farmers, who are mostly renters, on credit, the larger holdings being more generally worked by their owners. The payment for these advances is secured by what is known as a lien.

The lien is a bond for the payment of a specified amount—usually about \$100—given to the storekeeper by the farmer, and pledging the growing crop as collateral security. On this acknowledgment of indebtedness—which by act of the legislature covers the entire crop of the party giving it—the farmer receives from time to time during the crop season such supplies as may be agreed on between him and the storekeeper. These liens, bonds, or mortgages on the growing crop are recorded in the office of the clerk of the court, the names of the parties with the amount of the debt and the date of the transaction alone being entered in a single line, in a book kept for the purpose, at the cheap rate of 10 cents an entry. This record gives these debts precedence of other indebtedness. The collection of these liens is equally simple, cheap, and prompt. On affidavit of the lien holder that he believes his debtor means to avoid payment, the clerk of the court orders the sheriff to seize the crop, and sell the whole, or so much of it as will pay the debt with costs, and to devote the proceeds to those purposes; while the lien nominally covers the entire crop, the parties making advances depend almost exclusively on the cotton crop, because of its easy convertibility into money. This greatly encourages the culture of cotton among the necessitous small farmers. This class of farmers have been steadily on the increase, and the farms which compare in size with those of former days are so few that they might be readily enumerated. In this entire region only 8 can be counted, where the acreage in cotton under one management exceeds 100 acres. It must be mentioned, however, that in the neighborhood of large farms, the product per acre, the rate of wages, and the value of lands are greater than where there are only small farms. Thus near Wedgefield, in Sumter county, Mr. Aycock purchased a large body of these red lands a few years since, at from \$4 to \$6 an acre, and commenced planting on a large scale. Three years afterward similar lands in the Wedgefield neighborhood were selling at \$25 an acre, while the very same character of land in adjacent townships, and indeed in most localities in this region, may be bought still at from \$3 to \$6 an acre.

Notwithstanding the great healthfulness of this region, the larger portion of the field work is performed by negroes. In some localities, however, as at Wedgefield, white immigration has commenced. Where the custom is to pay money wages, the rate for a full hand is \$120 for the year, with shelter, fuel, and food; for the month, from

\$8 to \$10, and by the day, from 50 to 75 cents. Where the share system or renting prevails, as in portions of Orangeburgh, wages are somewhat less, being about \$75 for the year, \$8 a month, and 50 cents a day, in the latter case without rations. The reason for this is that where lands are rented labor is so uncertain that employes cannot count on it and withdraw from hiring, thus diminishing the demand for labor more rapidly than the conversion of laborers into renters diminishes the supply. Beside, these renters working on a credit have constant necessity for cash, which they can only obtain by hiring out as day laborers, and so large is the number forced to do this that the market for day labor is overstocked and wages are reduced as a consequence.

Where labor is engaged by the year it is the universal practice to make contracts at Christmas time. Indeed, very little work is obtained from year hands after the November frosts until new arrangements are perfected during January for the coming season. Much loss in time and in the horse-power of the farm (which remains idle as a consequence) results. Thus fall plowing has to be abandoned chiefly on this account.

The condition of the laborers is comfortable. They are not advancing in the accumulation of property, for which they show little of the necessary "effective desire", but they are subjected to no hardships or privations sufficient in any way to check their rapid multiplication by natural increase. Before renting became so general, and as hired laborers, many of them acquired houses and land. This number is not increasing now, but from 5 to 25 per cent. of the field laborers, according to the locality, own houses, with more or less land.

METAMORPHIC REGION.—The larger portion of the lands are held in tracts of from 200 to 500 acres. On three-fourths of the farms mixed husbandry is practiced, and on the remaining fourth attention is bestowed almost exclusively to cotton. The attempt to raise farm supplies is, therefore, pretty general, and is reported as increasing except in Laurens, where it remains the same, and in Abbeville, where it is decreasing. Usually this attempt is in so far successful as to provide a considerable portion of the subsistence for farm hands and stock. Bacon is largely imported from the north and west, and sometimes hay and corn also, for farm use. In two instances these supplies are reported as brought from North Carolina. The amount of provisions raised for sale is everywhere inconsiderable. The facilities offered by railroads have largely contributed to this. For instance, in Chester the country mills, which were formerly numerous and flourishing, have been to a large extent abandoned, since it has been found easier to get meal by rail each week as required from the merchant mills in Augusta, Georgia, and there is an increasing tendency, under the low rates of through freights, to supersede the Augusta mills by the product of the northwestern mills.

The system of credits and advances prevails to a large extent, consuming from one-third to three-fifths of the crop before it is harvested. The statement is general that this is on the decrease, and is correct in so far that a larger amount of supplies is being produced at home and a larger number of purchases for cash are being made by farmers since 1875. On the other hand, the number of farmers having largely increased in the same period, the number working on advances, especially among the smaller farmers, has largely increased also. The records of the courts show that the number of liens on the growing crop is greatly on the increase, the rate of increase being 23 per cent. per annum for the last two years. The number of such liens on record in 11 of the counties under consideration is (there being no return from Union) 30,205, a number nearly equal to the number of farms; but as two or more liens are not unfrequently recorded against the same crop, probably not more than half of the growing crops are under lien. The aggregate value of these liens is \$2,354,956, an average to the lien of \$77. It appears that the five counties lowest in the ratio of farm productions to farm values have a larger amount in liens by 13 per cent. than the five counties standing highest in this ratio. In the former the recorded indebtedness is \$4.28 for each acre in cotton, on which crop alone liens are taken. In the latter it is \$2.84 per acre in cotton. As may be inferred from the number and average amount of these liens, they are mostly taken from the smaller farmers, usually renters, for advances made by the landlord, or more frequently by the storekeeper.

There has grown up in this region a system of banks, at the county-seats, for the accommodation of farmers. The National Bank of Newberry was the first to be established. Three-fourths of its accounts are with farmers, in amounts from \$40 upward. Only 65 of them, however, reach or exceed \$1,000. The loans during the crop season aggregate \$324,000, and are made purely on personal security or on collaterals; liens or mortgages are not asked for or given.

Field labor is performed exclusively by natives, and chiefly by colored laborers. In Spartanburgh two-thirds of the field labor is performed by whites; even where the colored population largely preponderates a considerable amount of it is done by whites, not unfrequently a much larger proportion than one would infer from the ratio between the races.

The laborers are healthy, easily managed, work moderately, and live easily. Their condition is reported as good in 8 localities; as improving in 2, and as poor, but contented and happy, in one. Very few negro laborers own land or houses in Newberry, York, and Abbeville. Sixteen per cent. own a house or land in Greenville, and 5 per cent. in Spartanburgh, Fairfield, Chester, and Laurens.

The prevailing wages of field labor is \$8 by the month, or \$100 by the year. In Greenville it is \$7, and in Laurens it is from \$8 to \$12 by the month. In portions of Fairfield it is \$75 for the year. In all cases the laborer is furnished with shelter, rations, and firewood, and almost invariably with a garden, and the privilege of raising poultry and some stock, a cow or a hog. The farm work is light, and the extreme care formerly given to preserving

the health of the slaves has bequeathed regulations regarding labor not customary elsewhere. Work commences at sunrise and is over with at sunset, no night work of any kind being required; the time allowed for meals varies, for dinner it is from one to three hours, according to the length of the days. All exposure to rain or bad weather, even in pressing exigencies, is scrupulously avoided, and during exceptionally chilly weather little work is obtained or expected from negro laborers.

A large proportion of the land is worked on shares. When the landlord furnishes the tools, stock, and stock-feed, he takes one-half the crop in Laurens, Chester, Abbeville, and York, and in portions of Fairfield and Spartanburgh counties. In Greenville and in portions of the counties last named the laborer takes one-third and the landlord two-thirds under the above conditions. In Greenville, also, the laborer takes two-thirds if he furnishes tools, stock and feed for it. The portion paid for land alone varies from one-third to one-fourth of the crop, the latter rate being the most general one. In Laurens, Newberry, and Spartanburgh, and in portions of Fairfield and Chester, wages are preferred, the laborer running no risks of the seasons, faring better, and working better in consequence. In Abbeville and York the share system is preferred and is the prevailing practice, the demands on the care and attention of the landlord is less, and the independence of control and freedom from steady work it affords the laborer is highly prized by him. In Greenville laborers owning stock, tools, and provisions find the share system most profitable, otherwise they prefer wages.

Tolerable satisfaction with the system prevailing in each locality is expressed, but the feeling is general that the relations of labor and capital are in a transition stage, and either that those now existing need perfecting, or that better ones would be preferred. Eight out of nine correspondents report that under the present system the lands are not improving, but deteriorating, especially those rented and worked on shares; the ninth only qualifies the general verdict by the expression that with care it improves. Though there may be much sad reality in these statements, they are considered in connection with the facts above given, which show that within the last decade the two leading crops in this region have increased, one by 172, and the other by 139 per cent.

Statements regarding the average market value of land vary with every locality; they are for Greenville and Laurens from \$6 to \$10 an acre, for York \$6, for Abbeville and Spartanburgh \$10, for Newberry from \$6 to \$25, for Fairfield from \$3 to \$15, and for Chester from \$7 to \$18. There is little land for sale, but nearly all of it is for rent. Only 3 out of 11 correspondents state the rental of land in money; it is put in York and Chester at \$2, and in Laurens at from \$3 to \$4. Three state that no land is rented for money; in these cases one-fourth to one-third of the crop—estimated in Fairfield at an average of \$5 an acre—is given, or a larger proportion where stock and other supplies are furnished. In Abbeville the average rent is given as 3 bales of cotton for so much land as one plow can cultivate; in Fairfield it is 900 pounds, and in Chester as much as 1,200 pounds of lint; or, in other words, something over 1,000 pounds of lint cotton, worth \$100, for the rent of 30 acres of land. This would be \$3 33 rental per acre, which is the interest at 7 per cent. on capital of \$47 50; taking 7 per cent. as the standard rate of interest, this may be taken as the intrinsic value at present of the arable lands of this region. As, however, only 28 per cent. of the lands are under the plow, this amounts only to an average minimum valuation of \$13 30 per acre for all the land tilled and untilled.

As stated in the returns of the Tenth United States Census, which may be considered as fairly up to the actual average market values, the lands with all farm improvements are put at an average of \$4 87 an acre. At this valuation, placed upon them by their owners, these lands are paying dividends not less than 23 per cent. per annum, not taking into account that more than two-thirds of these values are wholly unemployed, and that the remaining one-third is operated mainly by the poorest and most ignorant class of the community, where want of means alone would prevent them from obtaining such returns as good culture would give.

PIEDMONT REGION.—The farms are very rarely larger than can be worked by four horses. The landholdings average from 150 to 300 acres, including wood lands. The larger portion of the farm supplies are raised at home, but near the towns and along the Air-Line railroad supplies from the west are largely purchased; the system of credits and advances to the smaller farmers prevails, absorbing, with rents, not unfrequently seven-eighths of the entire crop. Most of the land is rented or worked on shares. The cash rental varies from \$2 50 to \$4 an acre; the usual terms are one-fourth the cotton, and one-third of the grain; where stock and implements are furnished by the landlord he gets one-half the crop. The average market value of the lands is stated at \$5 an acre; improved lands sell at from \$6 to \$10 per acre. About one-half the field laborers are negroes, and since the extension given to cotton culture they are on the increase. Wages are 50 cents a day; from \$6 to \$8 a month with board; \$75 a year with board. The condition of industrious laborers is good. The number of negro laborers owning houses or land varies from 1 to 5 per cent., according to the locality.

COST OF COTTON PRODUCTION.—The estimated cost of production of the sea-island variety is from 15 to 20 cents per pound; that of the upland or short staple is from 7 to 9 cents, though a few correspondents place the estimate at 5 or 6 cents, and others at 10 cents.

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